



2040  
ROCKVILLE

# Comprehensive Master Plan – Update Initiative



## Transportation Scan



**June 2015**

City of Rockville

Traffic and Transportation Division

# **TRANSPORTATION SCAN**

# TABLE OF CONTENTS

Introduction .....	3
Process for Developing the Scan .....	3
I. Projected Population and Employment Growth .....	4
II. Rockville's Transportation Facilities .....	5
A. Automobile .....	6
Automobile Facilities .....	6
Metrics .....	9
Issues and Challenges .....	17
B. Transit .....	19
Transit Facilities .....	19
Metrics .....	21
Issues and Challenges .....	23
C. Bicycle .....	25
Bicycle Facilities .....	25
Metrics .....	26
Issues and Challenges .....	31
D. Pedestrian .....	32
Pedestrian Facilities .....	32
Metrics .....	33
Issues and Challenges .....	35
III. City of Rockville Transportation Initiatives and Policies .....	37
A. Multimodal Initiatives and Policies .....	37
Manual on Uniform Traffic Control Devices .....	37
Transportation Demand Management .....	38
Comprehensive Transportation Review (CTR) .....	39
Complete Streets Policy .....	40
Guidelines For Neighborhood Traffic Management .....	44
Street Lighting Program .....	45
B. Automobile Initiative .....	46
Road Code .....	46
C. Transit Initiatives and Policies .....	47

Maryland Transit Administration Corridor Cities Transitway (CCT).....	48
Montgomery County Bus Rapid Transit (BRT) .....	48
D. Bicycle Initiatives and Policies.....	49
Bikeway Master Plan .....	49
Bikeshare .....	49
Bicycle-Sensitive Traffic Signals .....	49
E. Pedestrian Initiatives and Policies.....	51
Pedestrian Policies.....	51
Sidewalk Prioritization Policy .....	51
Pedestrian Safety and Accessibility Evaluation .....	53



## INTRODUCTION

The Transportation Scan presents a description of transportation policies and facilities in Rockville and focuses, where possible and appropriate, on their adequacy at present and over the next 20-30 years. Evaluation takes into account projected population and changing conditions in such areas as demographics, service standards, technology, and other relevant factors.

This document is one of a series of scans that are being developed in preparation for updating the City of Rockville's Comprehensive Master Plan (CMP). Topics covered in other scans include, but are not limited to, Community Facilities, Housing, Land Use, Historic Preservation, Economy and Environment. The purpose of the scans is to help residents, the Mayor and Council, the Planning Commission, City staff, advisory bodies and other stakeholders understand the existing and projected city conditions so that the policies developed in the master plan will be informed by data and trends.

The scan topics have been chosen to align with required or optional Master Plan *Elements* established in the State of Maryland Land Use Article, which is the portion of the state code where Maryland local government rights and requirements with respect to master plans are defined. Transportation is a required element.

*Scans* are not elements: but rather precursors to elements. Elements will be developed after extensive outreach and public engagement processes to seek community and stakeholder input. As such, this Transportation Scan does not provide new policy recommendations. It is intended, instead, to provide key information that, when combined with community priorities and values, will serve as the basis for Rockville to develop policies and goals during the upcoming master planning process.

## PROCESS FOR DEVELOPING THE SCAN

This scan is a technical document that has been developed by collecting data and information about the condition of transportation facilities and services. City staff gathered data from internal sources for Rockville-owned and -operated facilities, including police reports for crash data and the City's GIS database for roadway, bikeway, and sidewalk mileage. Further information was gathered on facilities managed by other entities. The Washington Metropolitan Area Transit Authority (WMATA) was contacted for Metrorail ridership data for the Red Line and the Montgomery County Department of Transportation was contacted for ridership data on RideOn bus routes.

Transportation facilities in the Washington, DC region, as in other parts of the country, are owned and managed by various entities. The City of Rockville owns most, but not all, of the roads, intersections, and sidewalks in Rockville. The City does not own or operate many of the major thoroughfares in Rockville such as Rockville Pike, Veirs Mill Road, and I-270. These roads are owned by the Maryland State Highway Administration (SHA) and their signals are mostly operated and maintained by Montgomery County. The City also does not operate any of the various transit services, which are operated by WMATA and Montgomery County. However, the transit services are

used by those who live, work, play, and shop in Rockville and, the quality of these services contribute to the overall quality of life and economy of the City.

The practical importance of an adopted Transportation Element, as part of the overall Comprehensive Master Plan, is that it will guide City decision making in the following main areas:

1. City planning and budget decisions, with particular focus on:
  - The areas that need to be developed and/or constructed;
  - The Capital Improvements Program (CIP), where construction and maintenance of City facilities is funded; and
  - City decisions to fund and/or partner with private providers of key services such as water, sewer, trash collections, parks, etc.
2. City interactions with other levels of government or quasi-governmental entities – especially Montgomery County, the State of Maryland and WMATA – regarding the City’s priorities. For example, the City may, in its Transportation Element, state that it is a high priority for the City to explore opportunities to re-design transportation routes that converge at the Rockville Metro station.

With that purpose in mind, this scan is organized into three sections, including:

- I. A brief background on Rockville’s population and employment to better understand transportation in context (Projected Population and Employment Growth),
- II. A breakdown of Rockville’s existing transportation facilities by mode (Rockville’s Transportation Facilities); and
- III. Summaries of initiatives that affect transportation, organized by mode (City of Rockville Transportation Initiatives).

## I. PROJECTED POPULATION AND EMPLOYMENT GROWTH

Rockville’s population was 61,209 on April 1, 2010, (U.S. Decennial Census) which was a growth of 29.2 percent over the previous decade. As of July 1, 2014, the estimated population of Rockville was 65,937 (U.S. Census Population Estimates). Growth is expected to continue with the population projected to reach approximately 82,800 in 2040.<sup>1</sup> Rockville is also a major employment center. As of 2010, there were approximately 74,000 jobs in the City. This number is projected to increase to approximately 106,000 in 2040.

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<sup>1</sup> Round 8.3 Cooperative Forecasts were prepared in coordination with other local governments as a part of regional effort coordinated by the Metropolitan Washington Council of Governments.

**Table 1: Rockville Population and Jobs over Time**

<b>Year</b>	<b>Population</b>	<b>Jobs</b>
2010	61,209	74,000
2014	65,937	[data not available]
2040 (Projected)	82,800	106,000

Montgomery County is also expected to grow, with population projected to increase from 972,600 in 2010 to 1,202,800 by 2040; and jobs projected to grow from 510,300 in 2010 to 715,100 in 2040<sup>2,3</sup>.

**Table 2: Montgomery County Population and Jobs over Time**

<b>Year</b>	<b>Population</b>	<b>Jobs</b>
2010	972,600	510,300
2040 (Projected)	1,202,800	715,100

This projected growth in population and in jobs is important to be aware of when evaluating current transportation conditions. The demand for all modes is likely to increase, and the existing networks will need to be strategically modified to accommodate all transportation users.

## II. ROCKVILLE'S TRANSPORTATION FACILITIES

Transportation facilities serve the various modes of transportation that people wish to use. The modes in Rockville are driving, transit (metro, inter-city, commuter rail, local and regional buses), bicycling, and walking<sup>4</sup>. This section of the Transportation Scan is divided into subsections; one for each transportation mode in the city:

- A. Automobile
- B. Transit
- C. Bicycle
- D. Pedestrian

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<sup>2</sup> Round 8.3 Cooperative Forecasts

<sup>3</sup> Rockville population and jobs are included in Montgomery County totals.

<sup>4</sup> Rockville has no air or water transportation.

Each subsection is comprised of three parts: an overview of the transportation facilities for that mode, the most recent available metrics, and a brief discussion of issues and challenges associated with that travel mode. Together these components create a snapshot of the existing transportation conditions in Rockville.

## A. AUTOMOBILE

The personal automobile remains the most popular mode of transportation of all trips in Rockville. Significant investment has been made to increase the efficiency and connectivity of the city's road network for the automobile. This subsection describes the existing automobile facilities in Rockville, metrics to understand their use, and issues and challenges that face drivers in the city.

### *AUTOMOBILE FACILITIES*

There are approximately 180 miles of roadways in the City of Rockville. Table 3 outlines the classifications of each street and the number of miles owned by the City and state.

**Table 3: Roadway Mileage by Ownership, in miles**

<b>Rockville Classification (Standard Term)</b>	<b>City of Rockville</b>	<b>State of Maryland</b>
Limited Access (Freeway)	0.0	16.22
Major (Major Arterial)	4.51	10.58
Arterial (Minor Arterial)	6.67	2.20
Primary Residential Class I (Major Collector)	9.26	0.0
Primary Residential Class II (Minor Collector)	25.41	0.0
Secondary Residential (Access)	87.34	0.0
Business District (Major/Minor Collector)	10.94	0.49
Primary Industrial (Major Collector)	7.17	0.0
Secondary Industrial (Minor Collector)	1.22	0.0
Alley	1.06	0.0
<b>TOTAL</b>	<b>153.58</b>	<b>29.49</b>

### **Street Functional Classifications**

Street classifications in Rockville are summarized in Table 4. Each classification serves a different function, and the typical volume threshold for each street classification is defined in the City's Master Plan. It should be noted that the classifications and their descriptions are common to the transportation field. Municipalities make further distinctions to fit the needs of their roadway network; however, the terms are generally universal. For example, Rockville makes a distinction between a major collector and minor collector with the classifications Primary Residential Class I and Primary Residential Class II, respectively.

**Table 4: Rockville Street Classification Descriptions**

<b>Rockville Classification (Standard Term)</b>	<b>Description</b>	<b>Typical Volumes</b>	<b>Examples</b>
Limited Access (Freeway)	Carries through traffic. Lanes are divided by a median. Access points are very limited.	50,000 to 250,000 vehicles per day	None under Rockville's jurisdiction
Major (Major Arterial)	Carries through traffic. Lanes are divided by a median. Access points are generally limited.	Greater than 25,000 vehicles per day	Wootton Parkway, E. and W. Gude Drive
Arterial (Minor Arterial)	Carries through traffic. Design is more limited than on major streets. Access is less limited.	10,000 to 30,000 vehicles per day	Maryland Avenue, Twinbrook Parkway
Primary Residential – Class I (Major Collector)	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Greater than 5,000 vehicles per day	Great Falls Road, Hurley Avenue
Primary Residential – Class II (Minor Collector)	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Up to 5,000 vehicles per day	Grand Champion Drive, Monroe Street
Secondary Residential (Access)	Provides local access to residential properties. All non-primary streets are classified as secondary.	Up to 2,000 vehicles per day	Anderson Avenue, Atlantic Avenue
Business District (Major/Minor Collector)	Serves adjacent business land use. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day	Chapman Avenue, N. Washington Street
Primary Industrial (Major Collector)	Serves adjacent industrial and office land uses. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day	Dover Road, Southlawn Lane
Secondary Industrial (Minor Collector)	Serves adjacent industrial and office land uses. Typically has two undivided traffic lanes.	Up to 2,000 vehicles per day	Seven Locks Road, Truck Street

## Bridges

Within city limits, there are a total of 102 bridges. The types of bridges are shown in the table below.

**Table 5: Counts of Bridge Type in the City**

Bridge Type	Description	Count
Long Span Vehicular (LSB)*	Spans greater than 20ft	18
Small Structure Vehicular (SSB)*	Spans are greater than 6ft but less than 20ft	40
Pedestrian Bridge (PB)	Any bridge designated for non-motorized travel along roadways or within parks	44

*\*As defined by Federal Highway Administration and Maryland State Highway Administration*

Sixty three of the bridges are located within City right of way, and are maintained by Public Works staff. This includes all of the City's LSBs and SSBs and five of the PBs. The remaining 39 PBs are located in city parks and are maintained by the Department of Recreation and Parks.

The City routinely inspects all LSBs every two years and SSBs every four years. Bridge condition assessment reports identify and prioritize bridge maintenance work, including replacement; repainting structural steel; lining culvert inverts; and rehabilitating damaged concrete, bearing plates, joints, guardrails, and other safety elements.

The Department of Public Works (DPW) and Department of Recreation and Parks work together on a joint maintenance project to assess the pedestrian bridges in the city which operates on a six-year inspection cycle.

The City includes the Bridge Rehabilitation Projects (one for the Transportation Program Area and one for the Recreation and Parks Program Area) every year in the Capital Improvements Program (CIP). The Transportation Program Area Bridge Rehabilitation project has been in the CIP since 1998 and the Recreation and Parks Program Area Bridge Rehabilitation project started in 2012. Funding sources for the Transportation Area Bridge Rehabilitation project typically include bond proceeds, speed camera violations, and the capital projects fund (property taxes, revenue from other governments, etc.).

## Traffic Control Devices

Traffic control devices include traffic signals, traffic signs, and pavement markings. The City of Rockville maintains 48 traffic signals, of which six are owned by SHA. Five of these state-owned signals are on MD 28 between Monroe and Laird Streets, and the sixth signal is located at the I-270 off-ramp at Tower Oaks Boulevard. The City established a preventive maintenance program where all traffic signals are maintained and checked periodically and then repaired as needed. There are

an additional 64 traffic signals in the City that are owned and operated by SHA and/or Montgomery County.

The City sign shop within DPW also maintains all traffic signs on City streets and performs work orders issued as directed by City traffic engineers. Likewise, existing pavement markings are refreshed as needed by DPW's Operations and Maintenance Division, and new pavement markings are installed by contractors after road resurfacing or when ordered by traffic engineers.

### ***METRICS***

According to the American Community Survey (ACS) between 2010 and 2012, it is estimated that 59.9 percent of Rockville residents drove alone to work, and another 8.5 percent carpooled to work. That is a total of 68.4 percent of Rockville residents of working age (16 and older) who use a personal automobile for the commuting trip.

Level of Service (LOS) is a qualitative measure to relate the quality of traffic service. Intersections are given grade letters based on the level of congestion a driver would experience. The grade letters for LOS at signalized intersections are shown in Table 6 below:

**Table 6: Intersection Level of Service**

<b>LOS</b>	<b>Range (% of capacity)</b>
<b>A</b>	Less than 59%
<b>B</b>	60% to 69%
<b>C</b>	70% to 79%
<b>D</b>	80% to 89%
<b>E</b>	90% to 99%
<b>F</b>	Greater than 100%

It should be noted that LOS only measures the congestion experienced by drivers but not the congestion experienced by other road users (pedestrians, bicyclists, etc.). Minimizing the congestion for drivers can often lead to compromises made in the safety and expediency of travel for non-motorized road users.

Table 7, Table 8, and Table 9 summarize the existing traffic volumes on Rockville's major roads, as well as the LOS at Rockville's intersections owned by both the Maryland SHA and the City of Rockville. Table 7 shows existing Traffic Volumes for roads in the City, maintained by the City, County, and State. Figure 1 and Figure 2 shows maps of the existing road network and traffic volumes, respectively. Table 8 show LOS data for intersections owned by the State SHA, while Table 9 shows LOS data for City-owned intersections. Following these tables are two maps showing the intersection LOS; Figure 3 shows the LOS for City intersections during the morning peak hours and Figure 4 shows the LOS for the same intersections during the evening peak hours.

**Table 7: Existing Traffic Volumes on Major Roadways**

Road Name	Location	Count Date	Daily Volume (Both Directions)	PM Peak Volume
E Gude Dr NB	N of MD 28	Oct 2009	35,904	1,417
E Gude Dr SB	N of MD 28	Oct 2009		1,393
Baltimore Rd EB	W of Twinbrook Pkwy	Oct 2010	5,654	212
Baltimore Rd WB	W of Twinbrook Pkwy	Oct 2010		491
Twinbrook Pkwy	S of Baltimore Rd	Oct 2010	10,090	306
Twinbrook Pkwy	S of Baltimore Rd	Oct 2010		599
Wootton Pkwy EB	E of Tower Oaks Blvd	Apr 2011	28,722	1,422
Wootton Pkwy WB	E of Tower Oaks Blvd	Apr 2011		820
Wootton Pkwy EB	E of Scott Dr	Dec 2010	14,338	557
Wootton Pkwy WB	E of Scott Dr	Dec 2010		608
Wootton Pkwy SB	S of Glen Mill Rd	May 2011	12,563	408
Wootton Pkwy NB	S of Glen Mill Rd	May 2011		700
Veirs Dr NB	S of Glen Mill Rd	Dec 2009	5,779	301
Veirs Dr SB	S of Glen Mill Rd	Dec 2009		185
Maryland Ave EB	W of S Washington St	Nov 2011	17,297	647
Maryland Ave WB	W of S Washington St	Nov 2011		719
Great Falls Rd NB	N of Falls Rd	Dec 2011	9,769	329
Great Falls Rd SB	N of Falls Rd	Dec 2011		384
Mannakee St EB	W of S Campus Dr	Nov 2009	8,030	253
Mannakee St WB	W of S Campus Dr	Nov 2009		359
Nelson St EB	W of College Pkwy	Apr 2009	8,928	430
Nelson St WB	W of College Pkwy	Apr 2009		350
W Gude Dr EB	E of Piccard Dr	Oct 2011	24,137	1,055
W Gude Dr WB	W of Piccard Dr	Oct 2011		996
W Gude Dr EB	W of Watkins Pond	May 2010	25,177	1,024
W Gude Dr WB	W of Watkins Pond	May 2010		1,003
Gaither Rd NB	N of W Gude Dr	Mar 2010	7,348	303
Gaither Rd SB	N of W Gude Dr	Mar 2010		330
Redland Blvd EB	E of Thompson Dairy	May 2011	11,985	941
Redland Blvd WB	E of Thompson Dairy	May 2011		241
Redland Blvd EB	E of Piccard Dr	May 2011	11,895	674
Redland Blvd WB	E of Piccard Dr	May 2011		500
MD 28 NB/EB	N of MD 586	Jun 2009	38,258	1,758
MD 28 SB/WB	N of MD 586	Jun 2009		1,323
MD 28 EB	E of I-270	Jun 2009	28,640	1,001
MD 28 WB	E of I-270	Jun 2009		1,178
MD 28 NB	N of W Gude Dr	Dec 2004	23,085	1,771
MD 28 SB	N of W Gude Dr	Dec 2004		797
MD 189 NB	S of I-270	Mar 2011	20,448	877
MD 189 SB	S of I-270	Mar 2011		915
MD 355 NB	N of Montrose Rd	May 2009	61,490	2,671
MD 355 NB	N of Montrose Rd	May 2009		2,133
MD 586 EB	W of Broadwood Dr	Jun 2011	25,423	1,199
MD 586 WB	W of Broadwood Dr	Jun 2011		1,676
E Gude Dr EB	W of Calhoun Dr	Oct 2005	39,490	1,885
E Gude Dr WB	W of Calhoun Dr	Oct 2005		2,064
Twinbrook Pkwy	E of MD 355	Nov 2008	23,890	1,770
Twinbrook Pkwy	E of MD 355	Nov 2008		619





## Road Network

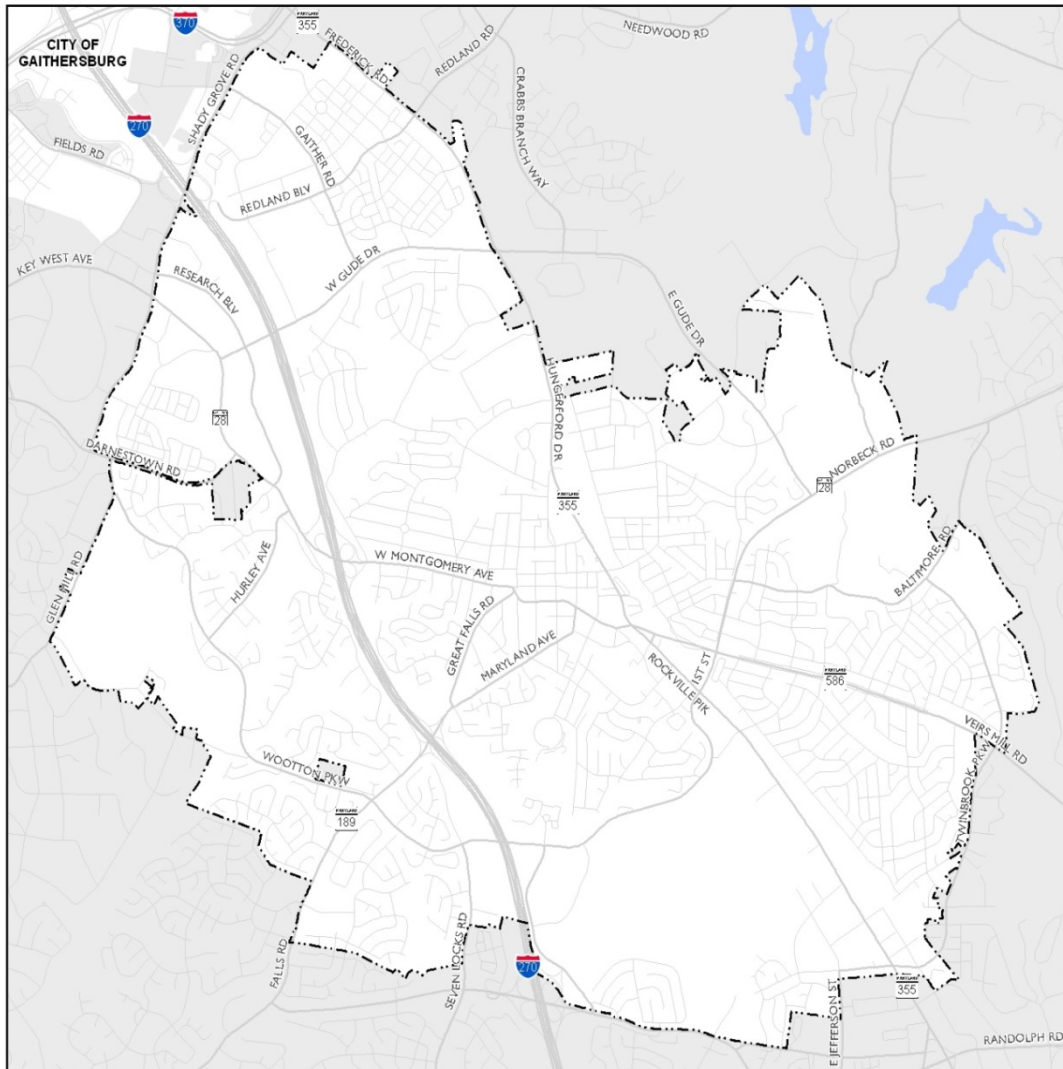
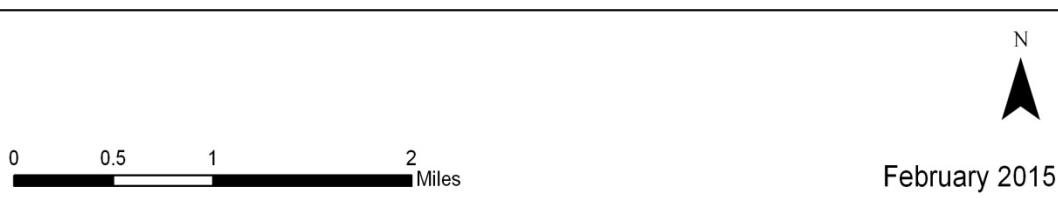


Figure 1: Road Network



12

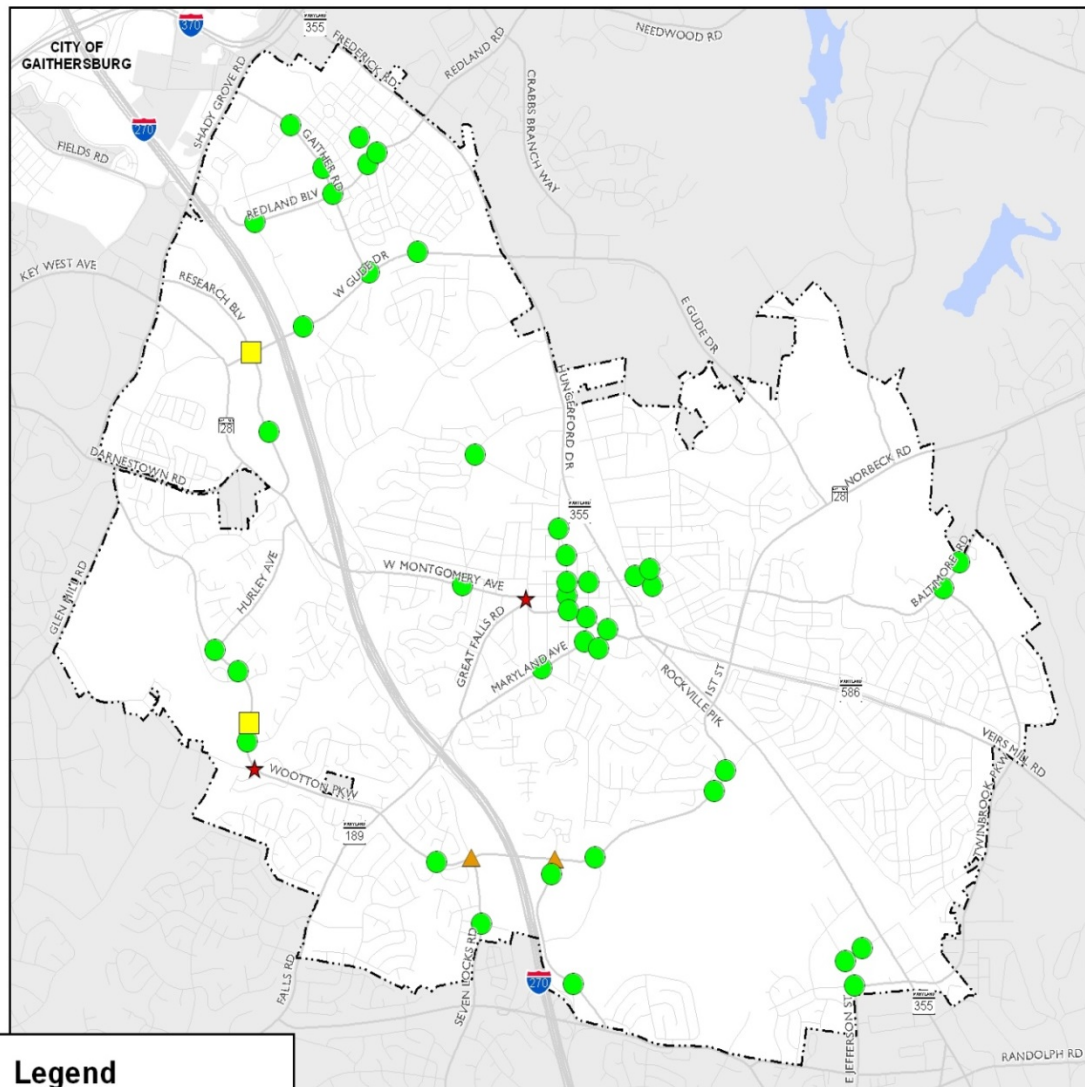
**Table 8: Level of Service Summary for SHA Intersections**

Intersection	Existing LOS		Count Date
	<i>AM Peak</i>	<i>PM Peak</i>	
MD 355/Ridgemont Ave	A	A	2011
MD 355/King Farm Blvd	C	C	Mar 2010
MD 355/Redland Blvd	D	C	Oct 2010
MD 355/Watkins Pond Blvd	B	C	2009
MD 355/W Gude Dr	E	E	Jan 2011
MD 355/College Pkwy	E	B	Oct 2004
MD 355/N Campus Dr	F	B	Oct 2004
MD 355/Mannakee St	E	B	2009
MD 355/Frederick Ave	A	A	Sept 2012
MD 355/N Washington St	B	C	Oct 2011
MD 355/Hungerford Plaza	A	A	2009
MD 355/Beall Ave	C	B	Sept 2008
MD 355/E Middle Ln	D	C	Feb 2008
MD 355/Monroe Pl	A	C	Jun 2011
MD 355/Veirs Mill Rd	B	C	Jun 2011
MD 355/Richard Mont Dr	D	B	2008
MD 355/Wootton Pkwy	F	F	May 2011
MD 355/Edmonston Dr	D	D	Oct 2012
MD 355/Woodmont Club	C	A	2008
MD 355/Templeton Pl	B	C	2010
MD 355/Congressional Ln	B	C	Oct 2011
MD 355/Halpine Rd	B	C	2010
MD 355/Rollins Ave	B	E	Mar 2011
MD 586/First St	D	E	Sept 2006
MD 586/Edmonston Dr W	B	D	Jun 2011
MD 586/Edmonston Dr E	A	A	Jun 2011
MD 586/Atlantic Ave	A	A	Jan 2011
MD 586/Twinbrook Pkwy	D	D	Jun 2010
MD 28/Baltimore Rd	C	E	Jan 2011
MD 28/E Gude Dr	C	C	Jun 2011
MD 28/Nelson St	C	D	Nov 2008
MD 28/Hurley Ave	B	C	Oct 2011
MD 28/Research Blvd	A	C	Oct 2012
MD 28/Darnestown Rd	C	C	Nov 2005
MD 28/W Gude Dr	A	C	Dec 2004
MD 28/Shady Grove Rd	D	D	Sept 2005
MD 189/Great Falls Rd	A	A	Feb 2013
MD 189/I-270 ramp	B	D	Apr 2002
MD 189/Wootton Pkwy	B	B	May 2007
MD 189/Kersey Ln	B	B	Oct 2001
MD 189/Dunster Rd	B	B	Oct 2001

**Table 9: Level of Service Summary for City Intersections**

Intersection	Existing LOS		Count Date
	AM Peak	PM Peak	
Nelson St/Mannakee St/Martins Ln	A	A	Sept 2010
Baltimore Rd/Twinbrook Pkwy	A	B	Oct 2010
King Farm Blvd/Pleasant Dr	A	A	Sept 2011
S Stonestreet Ave/Metro Entrance	A	A	Feb 2013
Park Rd/N Stonestreet Ave	A	A	Nov 2009
Redland Blvd/Thompson Dairy Way	A	A	Oct 2013
E Jefferson St/Halpine Rd	A	A	Sept 2011
E Jefferson St/Rollins Ave	B	B	Sept 2011
Halpine Rd/Congressional Plaza	A	A	Sept 2011
W Gude Dr/Research Blvd	D	C	Dec 2013
W Gude Dr/Piccard Dr	C	D	Nov 2010
W Gude Dr/ Gaither Rd	B	B	Dec 2010
W Gude Dr/Watkins Pond Blvd	B	A	Dec 2010
Wootton Pkwy/Edmonston Dr E	C	C	Dec 2010
Wootton Pkwy/ Edmonston Dr W	C	B	May 2011
Wootton Pkwy/Preserve Pkwy	A	A	Jan 2011
Wootton Pkwy/Tower Oaks Blvd	E	D	Apr 2011
Wootton Pkwy/Seven Locks Rd	E	D	Dec 2009
Wootton Pkwy/Henslowe Dr	B	A	Oct 2011
Wootton Pkwy/Greenplace Terr	B	A	Apr 2011
Wootton Pkwy/Hurley Ave	A	A	Apr 2011
Seven Locks Rd/Fortune Terr	A	B	Mar 2010
Redland Blvd/Gaither Rd	A	A	Oct 2011
Redland Blvd/Piccard Dr	C	B	May 2011
Redland Blvd/Pleasant Dr	A	A	Dec 2009
King Farm Blvd/Gaither Rd	A	A	Oct 2011
Maryland Ave/Argyle St	A	A	Apr 2010
Maryland Ave/Fleet St	B	C	Jun 2011
Fleet St/Monroe St	A	A	Nov 2011
N Washington St/W Montgomery Ave	A	A	Nov 2011
N Washington St/Middle Ln	A	A	Nov 2011
N Washington St/Beall Ave	A	A	Nov 2011
N Washington St/Dawson Ave	A	A	May 2013
Maryland Ave/E Middle Ln	A	A	May 2013
Jefferson St/Monroe St	B	B	Oct 2009
Jefferson St/Maryland Ave	B	B	Jun 2011
Jefferson St/Washington St	A	A	May 2013
W Montgomery Ave/Great Falls Blvd	F	F	Nov 2011
W Montgomery Ave/Laird St	B	D	Dec 2011
Tower Oaks Blvd/I-270 ramp	A	A	Jan 2012
Baltimore Rd/Rockville HS	C	A	May 2011
Research Blvd/Westat driveway	A	A	Feb 2013
Gaither Rd/Piccard Dr	A	A	Feb 2012
Tower Oaks Blvd/Commercial Dr	A	A	Mar 2013
Park Rd/S Stonestreet Ave	C	D	Mar 2010
Wootton Pkwy/Wootton HS	D	A	May 2011
Wootton Pkwy/Rockshire Entrance	C	A	Jun 2011
Wootton Pkwy/Scott Dr	F	A	May 2013

## Intersection Level of Service (AM Peak)



### Legend

- A - C (Acceptable)
- D (Some Delays)
- ▲ E (Frequent Delays)
- ★ F (Failing)

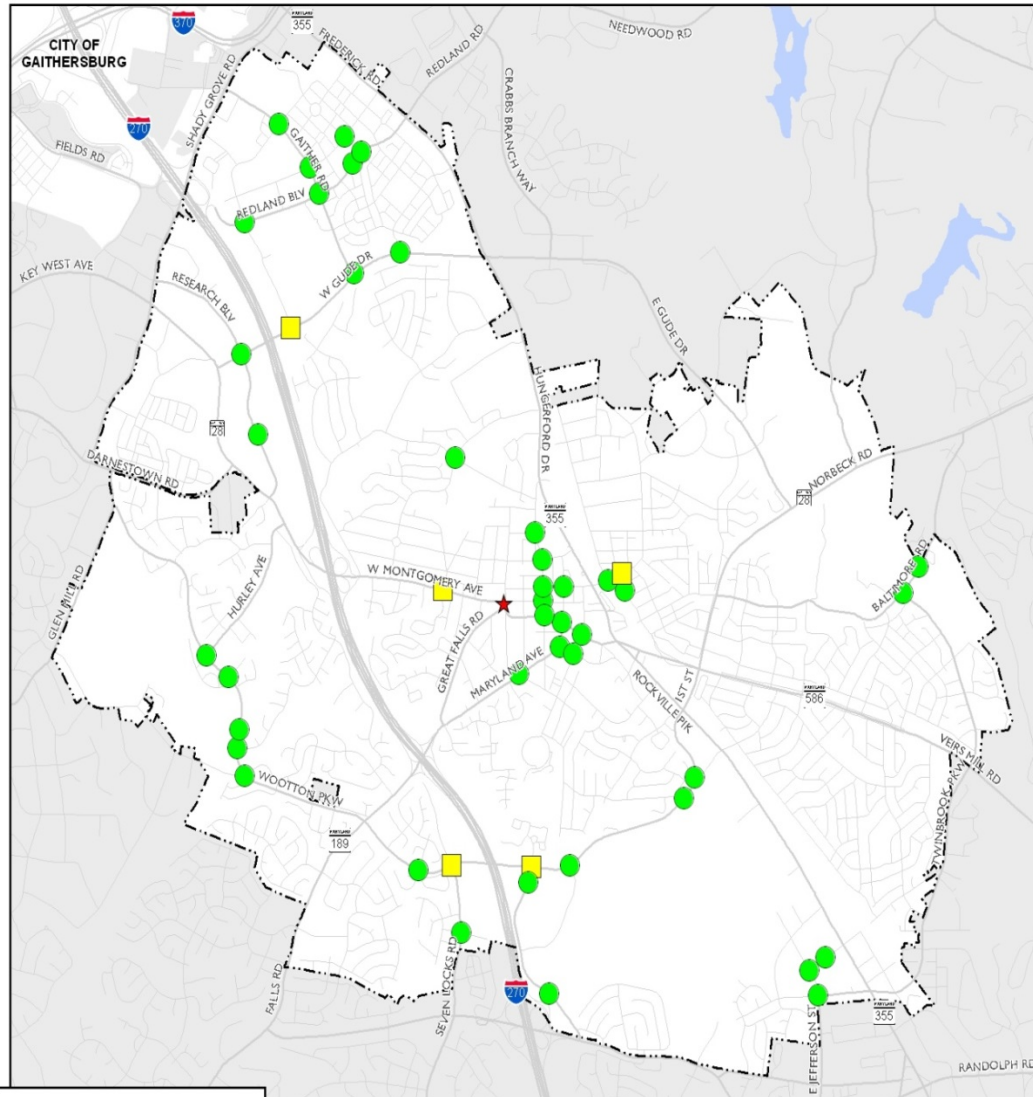
0 0.5 1 2 Miles



February 2015

**Figure 3: City-maintained Intersection Level of Service (AM PEAK)**

## Intersection Level of Service (PM Peak)



### Legend

- A - C (Acceptable)
- D (Some Delays)
- ★ F (Failing)

0 0.5 1 2 Miles



February 2015

**Figure 4: City-maintained Intersection Level of Service (PM Peak)**



The LOS for City-owned intersections is shown in Figure 3 (AM Peak) and Figure 4 (PM Peak). Four out of the 48 intersections maintained by the City of Rockville have a LOS of E or F during either the morning or evening peak travel hours. This means that roughly eight percent of the City's intersections experience frequent delays or are congested based on traffic engineering standards. The most challenging intersections are located near Town Center (W Montgomery Avenue and Great Falls Road) and along Wootton Parkway. This is not surprising as these locations are employment centers and transportation hubs.

In general, most of the intersections within City limits that have an LOS of E or F are owned by SHA and maintained by Montgomery County. As shown in Table 8, the failing intersections are predominantly located along the MD 355 corridor, in addition to one on MD 28 and one on MD 586. All of these intersections have roads with multiple lanes, carrying high volumes of traffic. The City of Rockville does not have jurisdiction and therefore cannot make improvements to these intersections; however, the City is routinely informed and consulted when SHA conducts work at these locations.

### *ISSUES AND CHALLENGES*

Secondary only to safety, an important issue for automobile travel is congestion. A number of intersections within Rockville are at, or near, failing conditions (i.e. exceed their acceptable LOS). Examples include the intersections of Rockville Pike/MD 28, Rockville Pike/Wootton Parkway, Rockville Pike/Congressional Lane, Rockville Pike/Halpine Road, and Rockville Pike/Twinbrook Parkway. Generally, City policies, procedures, and practices related to addressing automobile travel aim to reduce congestion and improve traffic flow, while addressing traffic safety for all users. Strategies to improve traffic flow are conceptually simple. Adding lanes and widening roadways can reduce traffic congestion; however, these strategies can be difficult or even infeasible to implement when dealing with an established road network, in a city that is largely built-out. These challenges arise when administering the Adequate Public Facilities Ordinance (APFO), which is described below.

### **APFO**

The Adequate Public Facilities Ordinance (APFO) defines public facility standards, and is designed to ensure adequate public facilities are available to serve new developments and the surrounding area. The City of Rockville enacted an APFO in 2005, and established the Adequate Public Facilities Standards (APFS) to implement the law. In 2011, the Planning Commission ordered a review of the APFO and APFS by an ad hoc committee of Rockville citizens and commercial stakeholders. In addition to a description of the role of the APFS, this memorandum includes the findings and recommendations of the APFO Review Committee related to transportation.

The APFO and the APFS play an important role in the process for reviewing new and redevelopment applications. The Comprehensive Transportation Review (CTR) process (discussed in greater detail in the Section III of this document) establishes the requirements and the acceptable thresholds for new peak automobile trips in and out of the project site. The Transportation Report, required by the CTR, is used to test if the development project meets the City's standards, but it does not go to the next level of denying a development if transportation

requirements are not met. The APFS sets the standards and the APFO states that if the transportation facilities are found to be inadequate, after reviewing the Transportation Report required by the CTR, the proposed project will be denied.

It should be also noted that, in some cases, a physical intersection improvement cannot be identified or the development's impacts cannot be mitigated within the CTR parameters. In other words, intersection mitigation via expansion or improvement of physical infrastructure (i.e., the addition of a travel lane to a road) is often not a viable option in Rockville due to limited right-of-way. Issues on Rockville Pike are the most notable because it is a state-controlled highway with limited space or additional vehicle lanes.

As mentioned previously, a significant number of intersections in Rockville are at or near failing grade levels. As a result, new developments in the vicinity of these intersections cannot proceed unless the project's impacts to adjacent intersections can be mitigated to the levels required by the CTR. These intersections, as well as all intersections in Rockville, are monitored on an ongoing basis to determine if delays are worsening, and if so, what can or should be done about it. In order to mitigate LOS at intersections, the City has the right to deny an application for development if the impacts of the proposed development would cause an intersection to drop to a substandard grade and the developer is unable to adjust the intersection accordingly.

#### *APFO Committee & their Recommendations*

In 2011, the Planning Commission appointed an ad hoc committee of Rockville citizens and commercial stakeholders to review the APFO and APFS. The APFO committee released its final report in November 2011, and their transportation related recommendations are listed below:

1. The City should engage in master planning for larger geographic areas within Rockville for transportation needs in order to address transportation issues in a more holistic manner, rather than in a piecemeal approach as each development projects unfold.
2. In the future, should the Rockville Pike corridor be redeveloped, it should occur in phases; later phases of development should not be allowed to proceed until transportation milestones are met. For example, aspects of the White Flint and Great Seneca Science Center projects that focus on the requirement for development to occur in phases based on milestones, including but not limited to (a) completion of transportation infrastructure and (b) utilization of mass transit and non-automobile modes of transportation, are recommended as case studies for review by the Planning Commission.
3. The City should evaluate the maximum credit allowable for reduction of vehicle trips, which is currently set at 30 percent. For example, under certain circumstances, the City could consider allowing a trip reduction credit greater than 30 percent, provided that a trip reduction agreement with regular compliance monitoring is implemented.
4. The Comprehensive Transportation Review document should be amended to include a list of potential Transportation Demand Management strategies.



5. The City should periodically evaluate the efficacy of traffic mitigation options implemented by developers in the City, and update the APFS if deemed necessary.

6. The City should draw upon the data collected by the County and the Metropolitan Washington Council of Governments in regard to the efficacy of transportation mitigation options.

The Planning Commission thoroughly reviewed the APFO committee's recommendations over four work sessions from October 2012 through February 2013. City staff explained the CTR Review process and methodology, intersection capacity analysis and mitigation, Transportation Demand Management strategies and trip reduction credits, and alternative approaches that are being explored by Montgomery County.

In their report to the Mayor and Council, the Planning Commission stated that one of the key challenges observed during their analysis of transportation conditions is the difficulty in finding related examples inside or outside of Rockville that may be used to identify trends and changes in travel behavior when certain improvements are made or trip reduction programs are implemented. For instance, no specific data was found describing how many trips are reduced when a particular trip reduction measure is applied, which makes it difficult for the Planning Commission to advocate for a change in addressing traffic analysis as it relates to new development. There was extensive discussion, but ultimately no agreement by the Planning Commission to endorse a change to the approach to measuring congestion or the levels of congestion (the Critical Lane Volumes) that are currently prescribed in the CTR.

The Planning Commission recommended leaving the credit standard at 30 percent for the time being, regarding the number of automobile trips that may be reduced in the CTR for new applications within transit oriented areas. The Commission also recommended the Mayor and Council consider asking City staff to look into what it would take legally to have a procedure for applicants to follow if the City would permit a higher reduction (over the 30 percent rate), including remediation, and also what methodologies might justify trip reduction targets.

## **B. TRANSIT**

Rockville is situated along several transit routes, giving it access to the greater Washington, DC metropolitan region while also providing access to local destinations in the City. The Transit section of this scan describes existing transit facilities in Rockville, metrics to understand its use, and issues and challenges that transit users face in the City.

### *TRANSIT FACILITIES*

A variety of transit options run in and through Rockville, including the following: Amtrak, MARC trains, Metrorail, Metrobus, RideOn, and paratransit. These options are summarized below:

#### **Amtrak**

The Amtrak Capitol Limited train runs between Washington, DC and Chicago via Pittsburgh and Cleveland. The last stop on this train before Washington's Union Station is in Rockville, adjacent to

the Rockville Metro Station and Rockville MARC Station on South Stonestreet Avenue. The Capitol Limited train runs daily, with stops in Rockville at 12:10 PM (eastbound) and 4:29 PM (westbound).

### **MARC Trains**

The Maryland Area Regional Commuter (MARC) train system is run by the Maryland Transit Administration and connects various points in Maryland and West Virginia to Washington, DC and Baltimore on three lines: Brunswick, Camden, and Penn. The Brunswick line runs between Washington, DC and Martinsburg, WV through Rockville. The commuter rail runs Monday through Friday and stops at the Rockville station nine times in the morning between 5:45 AM and 8:41 AM en route to Washington, DC and nine times in the evening between 3:59 PM and 7:50 PM en route to Martinsburg, WV.

### **Metrorail**

The Washington Area Metropolitan Transit Authority (WMATA) runs a series of six subway lines throughout the Maryland, Virginia, and DC area. Metrorail's Red Line travels between Shady Grove and Glenmont via Washington, DC. There are two stops along the Red Line in Rockville: Rockville and Twinbrook. Headways in each direction are usually between four and eight minutes on weekdays and between 12 and 15 minutes on weekends. The first train leaves Rockville in the morning at 5:03 AM and the final train leaves Rockville at night at 12:36 AM. Connections to all other Metrorail lines can be found in Washington, DC at the Metro Center and Gallery Place/Chinatown stations. Both Metrorail stations in Rockville also offer car parking, bicycle parking (both short term and long term), and car-sharing. There are also two Metrorail stations just outside of the City limits that are frequented by Rockville residents and visitors: Shady Grove and White Flint. Shady Grove is the terminus of the Red Line and is located directly across MD 355 from Rockville's King Farm neighborhood.

### **Metrobus**

WMATA also runs an extensive series of bus lines throughout the region, including many that serve Rockville and its immediate vicinity. Lines that serve Rockville include, but are not limited to: C4, J5, J7, J9, Q1, Q2, Q4, Q5, Q6, and T2. The City of Rockville works with WMATA and Montgomery County to provide American with Disabilities Act (ADA) accessible bus stops for Metrobus as well as bus shelters at high-volume bus stops where practicable. There are a total of 75 bus shelters in the City, at Metrobus and RideOn bus stops.

### **RideOn**

Montgomery County runs its own transit service, RideOn, through the Montgomery County Department of Transportation, which operates dozens of bus lines throughout the County. These bus lines carry passengers on local and regional trips through Rockville, including but not limited to: 5, 26, 43, 44, 45, 46, 47, 48, 52, 54, 55, 56, 63, 66, 81, and 93.

Route 45 operates completely within the City limits. First introduced in 1984, it is an east-west route between the Twinbrook Metrorail station and the Rockville Regional Transit Center in Fallsgrove. Other important stops in the City include the Rockville Metrorail station, Town Center, Montgomery College, and the office park on Research Boulevard. In 2003 City staff successfully

pursued a Capital Bus Program Funds Grant from the Federal Transit Administration. As a result, Rockville and Montgomery County entered an agreement to purchase and brand buses for the RideOn 45 Route. The “Round Rockville” fleet was in circulation from 2008-2010. Unfortunately in 2010 the bus model used for Route 45 was recalled due to a fleet-wide engine defect. In 2010 the Mayor and Council did not fund the branding of another fleet of buses, and therefore Route 45 was replenished with new RideOn buses with the transit service’s original branding.

### **King Farm Shuttle**

The King Farm Citizens Assembly operates the King Farm Shuttle. The service includes three circular routes in the King Farm neighborhood, with stops at the Shady Grove Metro station on all three routes. The King Farm Shuttle operates every 20 minutes from approximately 6:30 AM to 7:30 PM.

### **Paratransit**

Various paratransit services operate throughout Rockville. The City of Rockville offers a senior citizen bus service that can be used to transport Rockville residents 60 years of age and older to the Senior Center and to shopping destinations within the City. The Washington Metropolitan Area Transit Authority provides a Metro-Access program which offers shared rides door to door for people whose disabilities prevent them from using regular bus or rail service. Montgomery County also offers a Call-n-Ride service that provides subsidized taxi trips for seniors and low-income people with disabilities.

A map of the Metrorail stations and bus routes provided by Montgomery County and WMATA is shown on Figure 5.

### ***METRICS***

According to ACS estimates (2010 and 2012), 21.2 percent of Rockville residents took transit to work. This number includes all transit service, including Metrorail and all bus services.

The stops in the Rockville area along Metro’s Red Line (Twinbrook, Rockville, and Shady Grove) were opened in 1985. Since then, there has been enormous growth in ridership. Table 10, below, shows the growth in daily boardings between 1985 and 2013.

**Table 10: Growth in Daily Average Boardings, Metro Red Line, 1985-2013**

<b>Station</b>	<b>1985</b>	<b>2013</b>	<b>Change</b>
Twinbrook	2,354	4,569	194%
Rockville	2,140	4,900	229%
Shady Grove	4,050	13,444	332%

Not surprisingly, the Shady Grove station, which is western terminus of the Red Line, has more than double the boardings as compared to the other stations in Rockville. All three stations are spaced just over two miles apart, and yet the ridership is still relatively high amongst all three stations. The Rockville and Twinbrook Metro stations are routinely parked at capacity on weekdays, and during warm weather days, the Twinbrook Station experiences an overflow of bicycle parking demand. As congestion in Rockville and the surrounding metropolitan area increases, the demand for transit also increases.



While not as dramatic as rail transit, local and regional bus service has experienced a relatively steady increase in ridership as well. As an example, Montgomery County RideOn Route 45, shows a significant increase in boardings over the past decade. See Table 11 for a comparison between 2003 and 2013.

**Table 11: Growth in Daily Average Weekday Boardings, RideOn Route 45, 2003-2013**

<b>Direction</b>	<b>2003</b>	<b>2013</b>	<b>Change</b>
Eastbound	395	588	48%
Westbound	482	609	26%
<b>Total</b>	<b>877</b>	<b>1,197</b>	<b>36%</b>

Detailed data reports are not available for every year the Route 45 has been in operation, but the reports provided by Montgomery County RideOn show that bus ridership demand is increasing in the City. State and County regional transit plans are investing in bus rapid transit systems. In many cases the plans do not call for eliminating local bus transit routes, but instead recommend preserving and modifying local bus routes to help support and fill in gaps between stops along future bus rapid transit routes. If bus rapid transit routes are realized, it is possible that the demand for local bus service will continue to increase. Plans are underway for bus rapid transit routes serving Rockville Pike (MD 355) and Veirs Mill Road (MD 586).

### *ISSUES AND CHALLENGES*

As the City of Rockville residential and commercial densities increased, the demand for transit service has also increased. Although the City of Rockville does not administer transit services, the City coordinates with entities such as Montgomery County RideOn, WMATA, and private transit services to provide access to transit stations and stops. In addition, the City of Rockville maintains many bus transit shelters and other street furniture at bus stops. While some of the issues identified below are outside of the City's control, they are important to identify and understand.

### **Metrorail Capacity**

Most trains throughout the Metrorail system are only carrying six-cars even though the station platforms can support eight-car trains. This occasionally leads to overcrowding on trains and on the platform, especially during peak hours, as riders enter the system faster than they can be accommodated on trains. Forecasts suggest that ridership will likely increase, which is why WMATA is researching strategies to alleviate crowding in the system. In 2013, WMATA released a strategic plan that forecasts conditions through the year 2025. One of the key initiatives is to increase all trains during peak times to eight-cars. The Washington Metropolitan Area Transit Authority recognizes that adding two cars per train could greatly improve service and reduce

overcrowding<sup>5</sup>. Challenges to increasing to eight-car trains include costs (capital costs for the added trains as well as the amount of energy and resources to propel additional cars along the rails) and some train models are not equipped to add additional cars. To realize the initiative to run all eight-car trains during peak times, WMATA will need to upgrade a significant portion of the fleet as well as other rail infrastructure to accommodate the longer trains. Fortunately the improvements needed to advance this initiative are already planned as part of Metro's Six-Year Capital Improvement Program.

### **Metrobus and RideOn Service Conditions**

The City of Rockville has over 100 bus stops served by WMATA and Montgomery County RideOn Routes. Seventy-five of those stops have shelters that are maintained by the City.

Bus routes travel along high-volume roads such as Veirs Mill Road and Rockville Pike. As of 2014, all buses operate in mixed traffic, meaning there is not a designated bus lane. Bus transit users therefore experience similar traffic and congestion as drivers. Furthermore, a study conducted by WMATA in 2009 identified key issues for transit users along Veirs Mill Road including passenger crowding, bus bunching, poor schedule adherence, long travel times and others<sup>6</sup>. While the City does not own or maintain the more congested roads serviced by transit, the City occasionally coordinates with County and State agencies to improve travel conditions for all users. WMATA, Montgomery County and the State of Maryland are aware of these issues and are working to identify short term and long term improvement strategies.

Express bus service is a short-term strategy recommended for some of WMATA's bus lines including the Q9 route along Veirs Mill Road (MD586). Express bus service typically features fewer stops along the route than regular bus service to reduce bus bunching and improve service frequency. The trade-offs for express bus service is a significant increase in distance between stops, which can affect pedestrian access, patron convenience, and fare prices.

Bus rapid transit is a long-term strategy that has political support at the County level. In 2013 the Maryland National Capital Park and Planning Commission approved and adopted the Countywide Transit Corridors Functional Master Plan which includes plans for 11 bus rapid transit routes in Montgomery County, four of which pass through City limits (Corridor Cities Transitway, MD 355 North, MD 355 South, and Veirs Mill Road)<sup>7</sup>. The Corridor Cities Transitway (CCT) is in the initial

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<sup>5</sup> Metro2025 Strategic Plan 2013-2025 (2013). Washington Metropolitan Area Transit Authority. Pages 55-56, Accessed online October 3, 2014. Available: <http://planitmetro.com/2013/06/21/operating-longest-possible-trains-during-the-peak-period/#more-4418>.

<sup>6</sup> Q2 Metrobus Veirs Mill Line Study (2009). Washington Metropolitan Area Transit Authority. Pages 6-9. Accessed online October 4, 2014. Available: <http://www.metrobus-studies.com/QLine/Q2%20Final%20Report,%20July%202009.pdf>.

<sup>7</sup> Countywide Transit Corridors Functional Master Plan Amendment to the Master Plan of Highways. Accessed online June 12, 2015. Available: <http://tinyurl.com/nul8h5m>.

stages of design but is not yet funded for construction. Rockville has representation on the Advisory Committee for the CCT and the Study Groups for the Veirs Mill Road and MD 355 Routes. More discussion is provided in Section III of this scan.

### **Pedestrian Access to Transit**

Transit trips are dependent upon the transit rider's ability to get to a bus stop or transit terminal, and pedestrian access is a significant part of the transit rider's experience. In Rockville, there is viable pedestrian access from all sides of the Rockville and Twinbrook Metro stations. Designated pedestrian paths exist to reach destinations near both Metro stations, though safety and aesthetics could be improved. A rectangular rapid flashing beacon was installed outside of the Twinbrook Metro station along Chapman Avenue to facilitate safe crossings for pedestrians.

Most bus stops in Rockville are located along existing sidewalks and shared use paths. The City continues to install larger bus pads and ADA-accessible connections at many bus stops to facilitate more convenient and comfortable pedestrian access. Some bus stops need to be upgraded for pedestrian accessibility, including installing sidewalks where they are missing and installing connections to existing sidewalks. To address sidewalk gaps, Rockville has line items in the CIP for sidewalks each year based on available funds.

### **C. BICYCLE**

Bicycling serves two main purposes in Rockville: transportation and recreation. In 2004, the Mayor and Council established a goal to increase the safety and convenience of bicycling for all people, for all trips, and for all parts of the City. A draft Bikeway Master Plan update was submitted to the Planning Commission for review in February 2014<sup>8</sup>. The last Bikeway Master Plan was adopted in 2004. This section describes the existing bicycle facilities in Rockville, metrics to understand its use in context, and issues that bicyclists face in the City, along with the challenges associated with addressing those issues.

#### *BICYCLE FACILITIES*

Rockville currently has 67.93 miles of bikeways within City limits. Those bikeways are divided into four categories (which are outlined in Table 12):

- Bike lanes: designated on-road lanes for the exclusive use of bicyclists.
- Shared use paths: designated off-road trails to be used by both bicyclists and pedestrians.
- Signed shared lanes: lower volume, lower speed streets where drivers and bicyclists are encouraged to share the road. These streets are typically marked with a sign along the road marking that it is a "Bike Route."

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<sup>8</sup> The Planning Commission has the draft Bikeway Master Plan and held one work session on the draft in October of 2014. After the work session, the Planning Commission placed the Bikeway Master Plan on hold and has not indicated when the draft will be reconsidered.

- Signed shared lanes with “sharrows”: pavement markings that are placed in a lane of traffic to encourage a bicyclist to follow a specific trajectory and remind drivers that bicyclists may be present.

**Table 12: Bikeway Mileage in Rockville**

Bike Lanes	3.53 miles
Shared Use Paths	31.26 miles
Signed Shared Lanes	31.14 miles
Signed Shared Lanes with Sharrows	2.00 miles
<b>TOTAL</b>	<b>67.93 miles</b>

Maintenance responsibilities for these bicycle facilities are shared between DPW (all bike lanes, signed shared lanes, and signed shared lanes with sharrows, as well as those shared-use paths within the public right-of-way adjacent to a street) and the Department of Recreation and Parks (shared use paths within parks and paths not adjacent to a street, as well as the Millennium Trail).

The City also has three transportation bicycle and pedestrian bridges crossing major roads: the Friendship Bridge along W. Montgomery Avenue crossing Interstate 270, a smaller neighborhood bridge crossing Wootton Parkway to access Lakewood Elementary School, and a bridge connecting the Rockville Metro Station to downtown Rockville over MD 355. A fourth bicycle and pedestrian bridge, named the Unity Bridge, connects two sections of Frederick Avenue over the CSX tracks in northeast Rockville. Rockville was awarded a bronze level award for Bicycle Friendly Communities by the League of American Bicyclists in 2012.

Rockville’s bicycle facilities connect to bicycle facilities in Montgomery County, including the Rock Creek Trail to the east, the Bethesda Trolley Trail to the south, and the other shared use paths that connect to neighboring roads. Rockville’s bicycle network, as it exists today, is shown in Figure 6. A planning effort to improve bikeways in Rockville is underway. A draft was completed in 2014 and was presented to the Planning Commission.

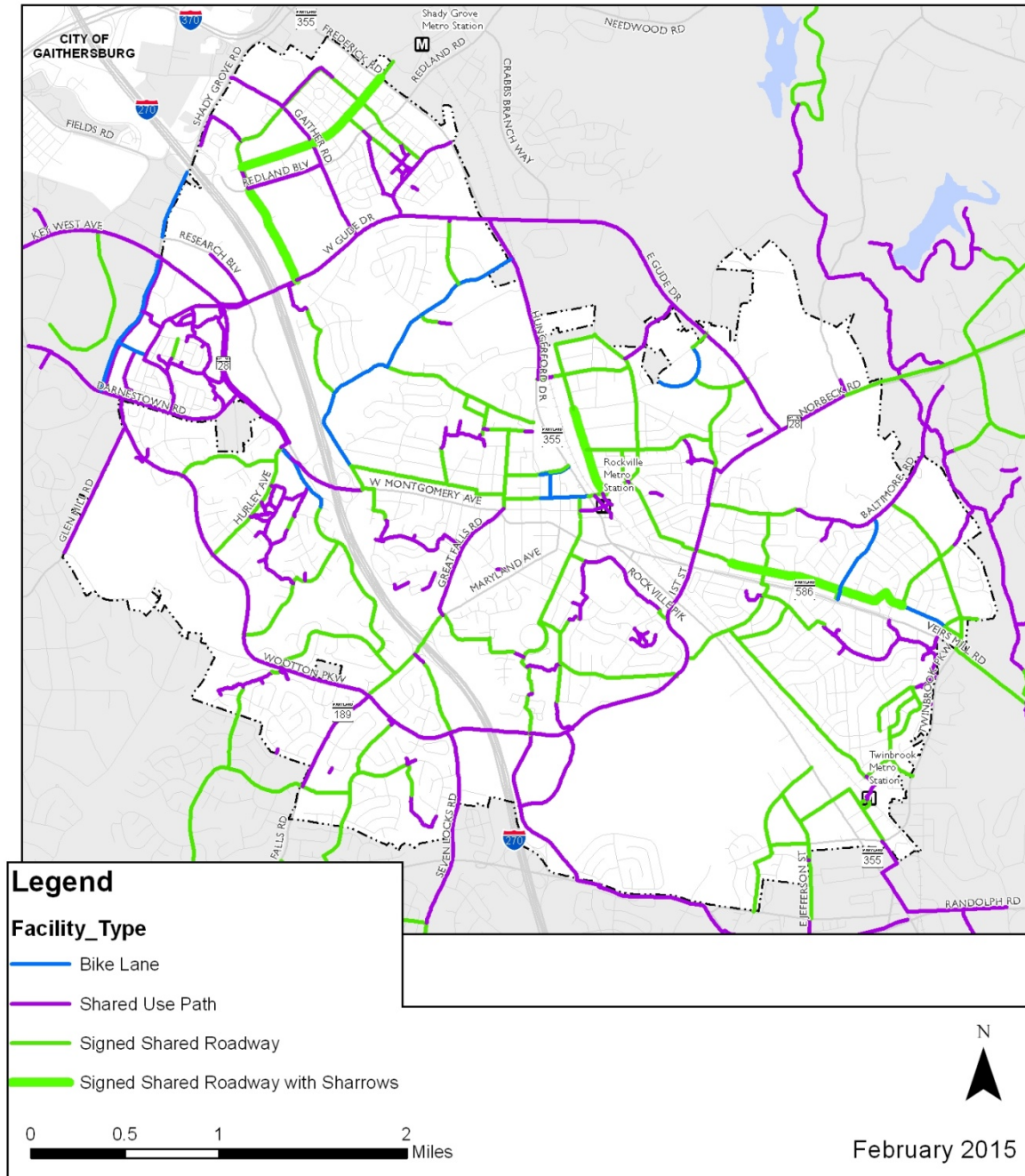
### *METRICS*

According to ACS estimates between 2010 and 2012, approximately 1.6 percent of Rockville residents of working age (16 and older) bicycle, ride a motorcycle, or take a taxi to work. The ACS estimates are the most accurate the City has of total bicycling around the City; however, the ACS only takes into account the primary portion of commuting trips. Therefore, bicycling trips for purposes other than commuting are not counted in this number. Bicycling trips are also included in with motorcycle and taxi trips as “other” modes of transportation.

The City selected four places along off-street shared use paths to collect bicycle data in 2011, 2012, and 2014. Tube counters were used to collect this data. These counters cross the width of the path and collect data on two-way travel. They are relatively reliable in counting the two wheels of a bicycle, but other types of pressure on the tubes occasionally get counted. Figure 7 shows the bicycle counts for 2011, 2012, and 2014. Overall, there has been an increasing trend in bicycle usage at each of these specific locations between 2011 and 2014.

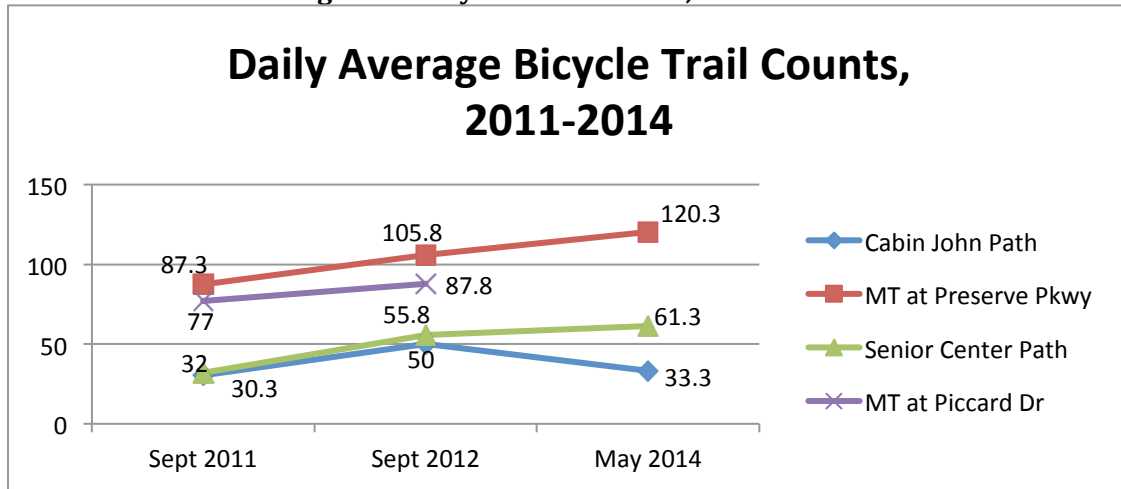


## Existing Bikeways



**Figure 6: Existing Bikeways**

**Figure 7: Bicycle Trail Counts, 2011-2014**



\*Note: Data was not available from the 2014 count for the Millennium Trail at Piccard Drive

The City conducted its first intersection-specific bicycling counts in September 2013, studying five intersections around Rockville using the protocol developed by the National Bicycle and Pedestrian Documentation (NBPD) Project. These counts were completed over two-hour periods on two consecutive days, and daily and annual bicycle counts are extrapolated from these counts using the methods set out by NBPD from years of collected data around the country to account for time of day, day of week, month, weather, and climate. Table 13 shows the extrapolated numbers for daily and annual bicycling activity at these five intersections. Because there is only a year and a half's worth of information, there is not yet enough data to draw conclusions from these numbers. However, staff intends to continue conducting these twice-annual counts to obtain adequate data.

**Table 13: Bicycle Intersection Counts, September 2013 – September 2014**

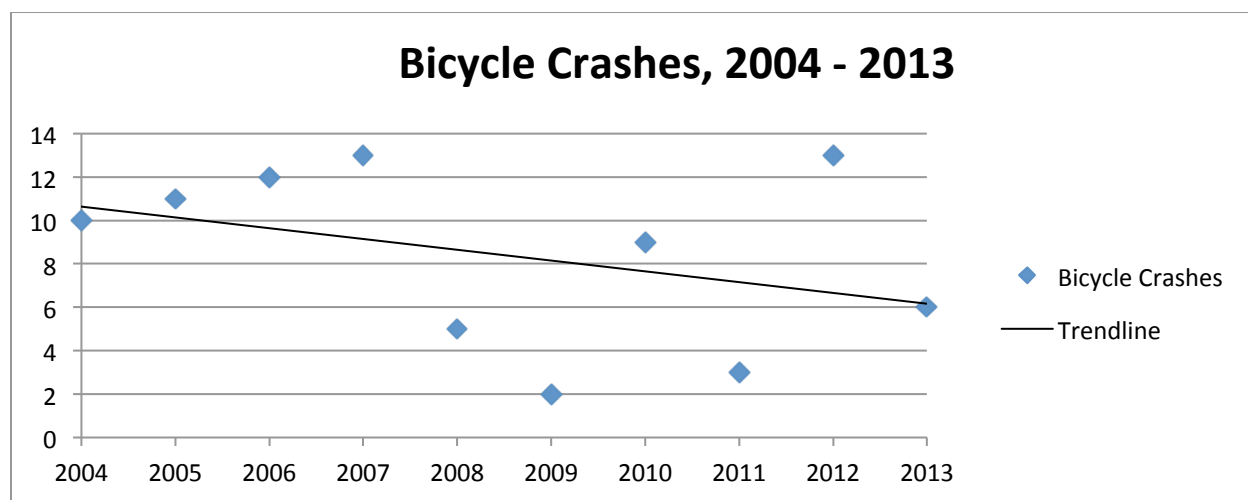
Intersection	Daily Bicyclists*			Annual Bicyclists*		
	Sept 2013	May 2014	Sept 2014	Sept 2013	May 2014	Sept 2014
Maryland Ave. and E. Middle Ln.	293	323	236	125,300	137,328	101,605
W. Montgomery Ave. and Nelson St.	143	135	116	61,684	57,486	50,480
W. Montgomery Ave. and Falls Grove Dr.	232	158	195	99,673	67,067	83,834
Rockville Pike and Halpine Rd.	116	165	176	49,579	70,261	76,623
Veirs Mill Rd. and Twinbrook Pkwy.	308	-	-	130,709	-	-
Twinbrook Pkwy. and Chapman Ave.	-	-	251	-	-	109,203
Broadwood Ave. and Grandin Ave.	-	-	240	-	-	107,143

\*Extrapolation based on NBPD protocol

## Crash Data

Crash reports involving bicycles and pedestrians are reviewed by the Traffic and Transportation Division, and safety measures are taken when appropriate. Since 2004, the average number of crashes reported per year involving bicycles is 8.4, and the trend in crashes involving bicyclists is decreasing though fluctuating. The data regarding crashes involving bicycles is summarized in Figure 8.

**Figure 8: Crashes Involving Bicycles, 2004-2013<sup>9</sup>**



Four intersections experienced two or more crashes involving bicycles between 2004 and 2013. They are listed with the intersections with highest number of crashes listed first:

- 6 - MD 355 and Edmonston Drive
- 3 - MD 355 and Templeton Place
- 2 - Maryland Avenue and East Middle Lane
- 2 - MD 355 and Park Road/East Middle Lane

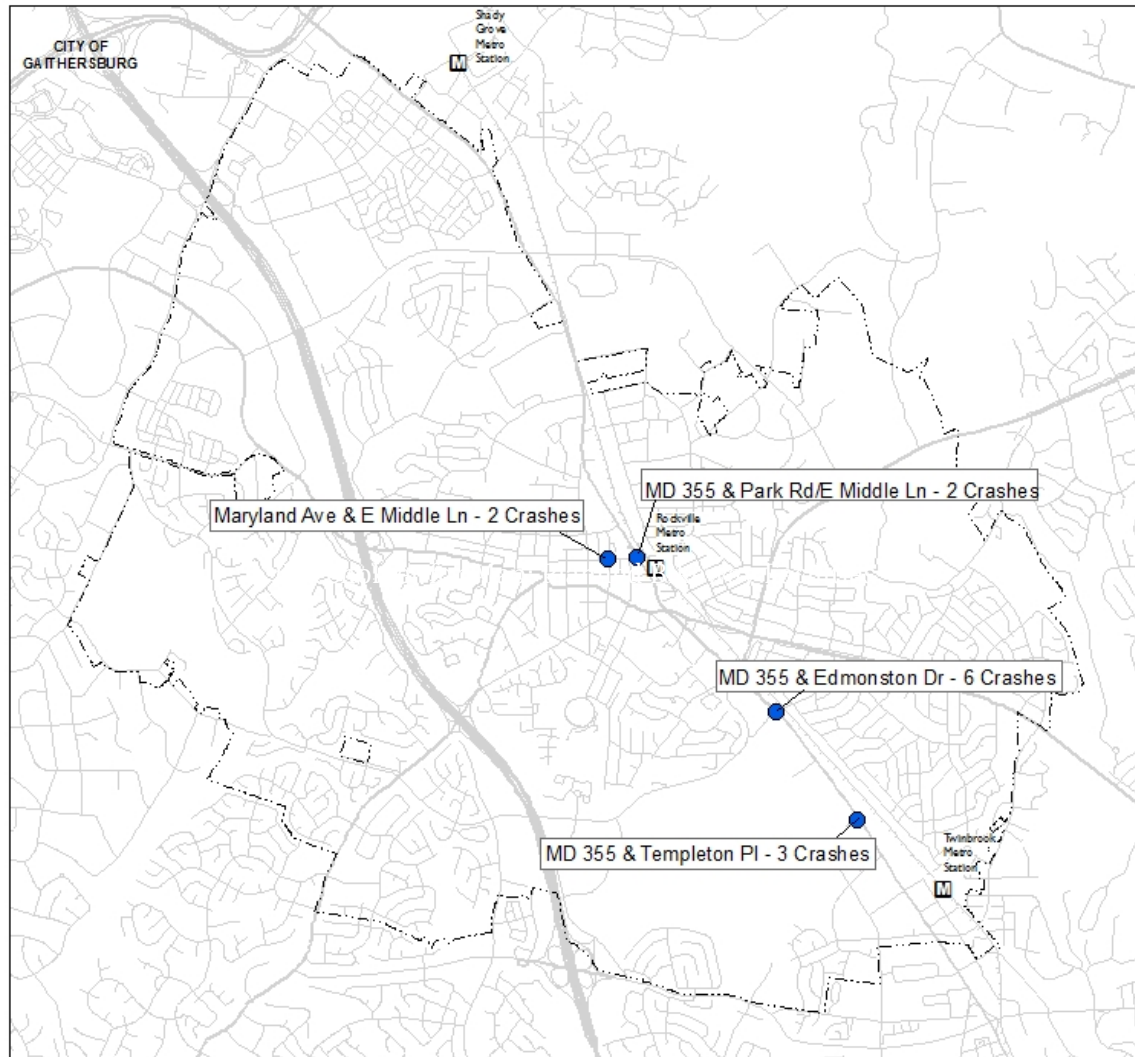
Reports documenting crashes are issued and list the contributing circumstances for each crash as determined by the responding officer. Staff began collecting this information in 2008. Between 2008 and 2013, drivers were found at fault in 70 percent of the crashes involving bicyclists. Out of the 37 crashes involving bicyclists between 2008 and 2013, the most common contributing circumstances for drivers at fault were failure to yield the right-of-way (15), failure to give full time and attention (12), improper right turn on red (2), and vision obstructions (2). The most common contributing circumstances for bicyclists at fault were failure to give full time and attention (12), failure to yield the right-of-way (6), and failure to obey a traffic signal (3). Note that more than one contributing circumstance could be documented per crash, leading to totals greater than 37. No hit and runs involving bicyclists were recorded between 2008 and 2013. Intersections with two or more crashes between 2008 and 2013 are included in Figure 9.

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<sup>9</sup> Does not include data collected by the Montgomery County Police Department (MCPD)



## Intersections with 2 or More Crashes Involving Bicyclists (2008 - 2013)



February 2015

Figure 9: Intersections with Two or More Bicycle Crashes 2008-2013

## *ISSUES AND CHALLENGES*

As is common for the region, Rockville's streets, commercial hubs, and employment centers were designed with the automobile as the primary transportation mode. This practice had an impact on bicycling conditions in the city today. Often the most direct routes between popular origins and destinations are major thoroughfares that are uncomfortable and uninviting to bicyclists. In some cases these roads can actually create barriers for bicycling. For example, bicycles are not allowed to ride on Interstate 270. While the highway is a direct and efficient route for cars, it is a barrier for bicyclists traveling east or west across the city.

Sometimes bicycle facilities can be added to roadways by widening or simply restriping the road. However, where the public right of way is already restricted, the opportunities to retrofit roadways to include bikeways are limited.

Connectivity isn't the only issue. Like cars, bicyclists need places to securely park their bicycles once they have reached their destinations. Previous land use development focused on making sites auto accessible, and as a result, a significant number of retail and employment centers have not provided capacity for secure and appropriate bicycle parking.

These issues can be even more difficult to address when dealing with roads owned and maintained by other agencies within City limits.

### **Bicycle Access**

A specific concern among residents and visitors is a lack of bicycle access to and on MD 355, particularly from the lower volume streets to the north and east of MD 355. The City encourages the use of lower volume and lower speed routes such as Lewis Avenue for bicycling. However, the CSX and WMATA railroad tracks create physical barriers between these streets and the businesses along MD 355. The distance between Edmonston Avenue to the north and the nearest fully functional access point over the train tracks at Twinbrook Parkway is over 1.25 miles, which can deter a person from using a bicycle for trips along this corridor.

### **Constricted Roadways**

Rockville was originally developed in the 18<sup>th</sup> and 19<sup>th</sup> centuries and much of it was built out in the mid-20<sup>th</sup> century. As such, much of the road network was not developed with enough room to satisfy all roadway users' needs. Many streets, particularly in the West End, are narrow and provide room for on-street vehicle parking but have sufficiently low traffic volumes to make on-street, separated bicycle facilities unnecessary. However, many higher volume streets make ideal candidates for separated bicycle facilities, but to do so would require the removal or creative repurposing of on-street parking on one or both sides of the road. Attempts to modify on-street parking have proven to be unpopular amongst some residents, which make it challenging to retrofit roads with designated bicycle facilities.

### **Bicycle Parking**

Rockville has had bicycle parking requirements in its zoning code for many years, but since most establishments were developed before these requirements were in place, many lack sufficient

bicycle parking. This lack of parking leads to cluttering and potentially unsafe situations where people may be forced to lock their bicycles to posts, fences, or railings.

### **Interagency Coordination**

As stated in other sections of this Transportation Scan, many of Rockville's major roads are owned and/or operated by SHA or the Montgomery County, and while they may be within City limits, the City is not able to control their design. For instance, MD 355 and Veirs Mill Road are prime examples of dense commercial areas that are ideal locations for bicycle travel, but due to high traffic volumes and speeds, they are not comfortable for most bicyclists. These roads were also built out before recent bicycle policies were adopted. Both SHA and the Montgomery County now have policies in place that require consideration for bicycle facilities during road construction and reconstruction activities, similar to Rockville's Complete Streets Policy.

### **D. PEDESTRIAN**

The older core of Rockville was first developed before the advent of the automobile, and walking was the transportation mode of choice. The popularization of the personal automobile changed the way people move around Rockville and the United States, but walking remains a common transportation choice, particularly between modes. This section describes the existing pedestrian facilities in Rockville, metrics to understand its use in context, and issues common with addressing the needs of pedestrians.

#### *PEDESTRIAN FACILITIES*

Rockville currently has 243.6 miles of sidewalk within City limits. Additionally, there are 29.5 miles of shared use paths throughout the city for a total of 273.1 miles of pedestrian facilities. Maintenance responsibilities of these pedestrian facilities are divided between DPW and the Department of Recreation and Parks. All traffic signals in the City also contain pedestrian signals. Details about ownership and operations of traffic signals are described in the Automobile section of this scan.

Rockville also uses modern technology to assist in pedestrian safety. The City is in the process of installing Automated Pedestrian Signals (APS) at all of the traffic signals owned by the City, following the lead of the County and State who are also installing APS at their own signals. APS are devices used to communicate information about pedestrian traffic signal phases in non-visual formats such as audible tones, verbal messages and vibrating surfaces. Funding for the APS signals has been mostly funded by speed camera tickets as part of a City traffic safety initiative. Forty-eight signals have been identified to receive APS and ADA upgrades, and 32 have been improved as of FY2015. In addition to APS, whenever an intersection is upgraded or redesigned, pedestrian ramps are brought up to new ADA accessibility standards at all four corners to include new slopes and detectable warning surfaces.

Likewise, Rockville also uses rectangular rapid flashing beacons (RRFB) at several locations in the City. These RRFBs can be installed at crosswalks that are not regulated by a traffic signal or a stop sign. When activated by a pedestrian, the beacons flash to alert drivers to follow the law and yield to the pedestrian. Three are in operation in the City (as of 2014) – at N. Washington Street and Wood Lane, Congressional Lane east of E. Jefferson Street, and Chapman Avenue across from the Twinbrook Metro Station.

### ***METRICS***

According to the ACS estimates between 2010 and 2012, approximately 2.5 percent of Rockville residents of working age (16+) walk to work. The ACS estimates are the most accurate estimates the City has of total walking in the City; however, the ACS only takes into account the primary portion of commuting trips. Therefore, walking trips for purposes other than commuting as well as walking trips that are part of another commuting mode (walking to transit, for example) are not counted in this number.

The City conducted its first intersection-specific walking counts in September 2013, studying five intersections around Rockville using the protocol developed by the National Bicycle and Pedestrian Documentation (NBPD) Project. These counts were completed over two-hour periods on two consecutive days, and daily and annual pedestrian counts are extrapolated from these counts using the methods set out by NBPD from years of collected data around the country to account for time of day, day of week, month, weather, and climate. Table 14 shows the extrapolated numbers for daily and annual pedestrian activity at these five intersections, which are near Town Center and significant commercial and residential areas. Because there is only a year and a half's worth of information, there is not yet enough data to draw conclusions from these numbers. However, staff intends to continue conducting these twice-annual counts to obtain adequate data.

**Table 14: Daily and Annual Pedestrian Counts, September 2013 – September 2014**

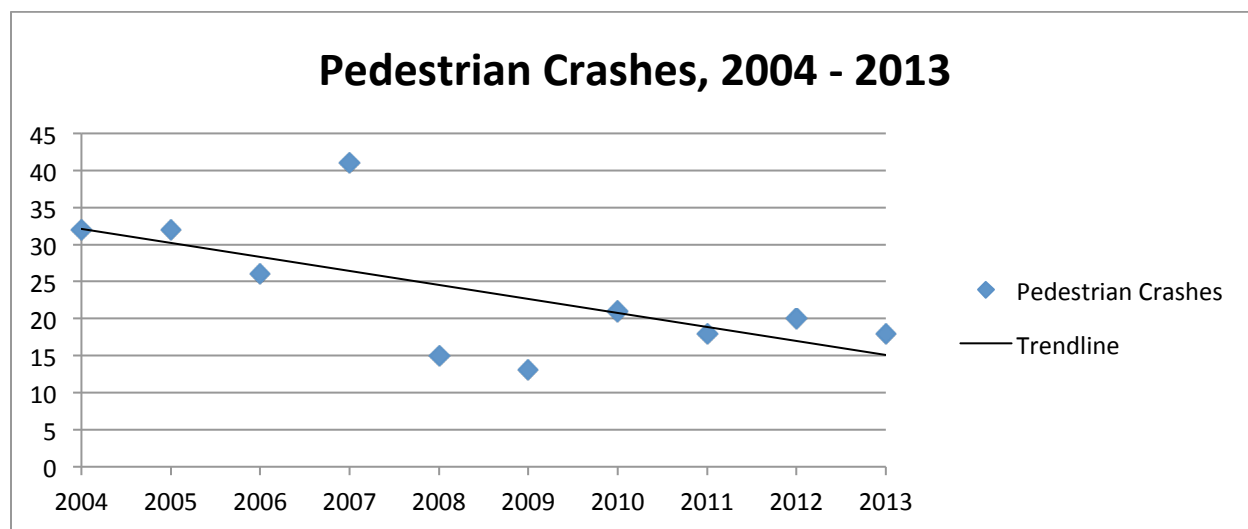
<b>Intersection</b>	<b>Daily Pedestrians*</b>			<b>Annual Pedestrians*</b>		
	Sept. 2013	May 2014	Sept. 2014	Sept. 2013	May 2014	Sept. 2014
Maryland Ave. and E. Middle Ln.	4,883	5,835	4,744	2,098,944	2,041,123	2,041,123
W. Montgomery Ave. and Nelson St.	143	105	161	61,684	44,712	69,282
W. Montgomery Ave. and Fallsgrrove Dr.	188	248	210	79,198	105,391	89,887
Rockville Pike and Halpine Rd.	2,745	3,185	3,259	1,182,950	1,344,540	1,393,243
Veirs Mill Rd. and Twinbrook Pkwy.	1,564	-	-	667,711	-	-
Twinbrook Pkwy. and Chapman Ave.	-	-	1,031	-	-	440,290
Broadwood Ave. and Grandin Ave.	-	-	263	-	-	11,7118

*\*Extrapolation based on NBPD protocol*

## Crash Data

Crash reports involving pedestrians are reviewed by the Traffic and Transportation Division. The Division has maintained data on crashes involving pedestrians and bicycles since 2004. Since 2004, the average number of crashes reported per year involving pedestrians is 23.6, and the trend in crashes involving pedestrians is steadily decreasing. There have been five fatalities involving non-motorized road users since 2004, all involving pedestrians. The data is summarized in Figure 10:

**Figure 10: Crashes Involving Pedestrians, 2004-2013<sup>10</sup>**



Seven intersections experienced six or more crashes involving pedestrians between 2004 and 2013. They are listed with the intersections with highest number of crashes listed first:

- 11 - MD 355 and Edmonston Drive (commercial area along Rockville Pike with residential areas on both sides)
- 11 - Veirs Mill Road and Atlantic Avenue (Veirs Mill Road shopping area)
- 11 - MD 355 and Halpine Road (Twinbrook Metro area)
- 10 - MD 355 and Beall Avenue (Rockville Metro area/Town Center)
- 7 - Maryland Avenue and East Middle Lane (Rockville Metro area/Town Center)
- 7 - MD 355 and Park Road/East Middle Lane (Rockville Metro area/Town Center)
- 6 - MD 355 and Redland Road (Shady Grove Metro area/King Farm residential area)

Reports documenting crashes are issued and list the contributing circumstances for each crash as determined by the responding officer. Staff began collecting this information in 2008. Between 2008 and 2013, drivers were found at fault in 62 percent of the crashes involving pedestrians. Of the 104 crashes involving pedestrians, the most common contributing circumstances for drivers at fault were failure to give full time and attention (51), failure to yield the right-of-way (38), vision

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<sup>10</sup> Does not include data collected by MCPD



obstructions (5), failure to obey traffic controls (5), and driving too fast for conditions (4). The most common contributing circumstances for pedestrians at fault were “illegally in roadway” (30), failure to give full time and attention (24), “clothing not visible” (8), failure to yield the right-of-way (7), and failure to obey a traffic signal (7). Note that more than one contributing circumstance could be documented per crash, leading to totals greater than 104. Ten hit and runs involving pedestrians were recorded between 2008 and 2013. Intersections with two or more crashes between 2008 and 2013 are included in Figure 11.

### *ISSUES AND CHALLENGES*

All people are pedestrians at various times of their day, whether they are walking to a bus stop or walking from a parking lot to the store. Furthermore, pedestrians are the most vulnerable transportation users. To travel comfortably and safely, they require designated, off-road facilities. Creating a well-connected, comfortable network for pedestrians is an issue that all cities face. For many years, roadways and intersections were built without sidewalks and other pedestrian safety facilities and retrofitting to address these issues can be challenging. For example accommodating cars and pedestrians at the same intersection, users with very different needs, can be difficult. Addressing the needs of all users is even more complex if the roadway is in the City limits, but is owned and maintained by another agency.

### **Sidewalk Gaps**

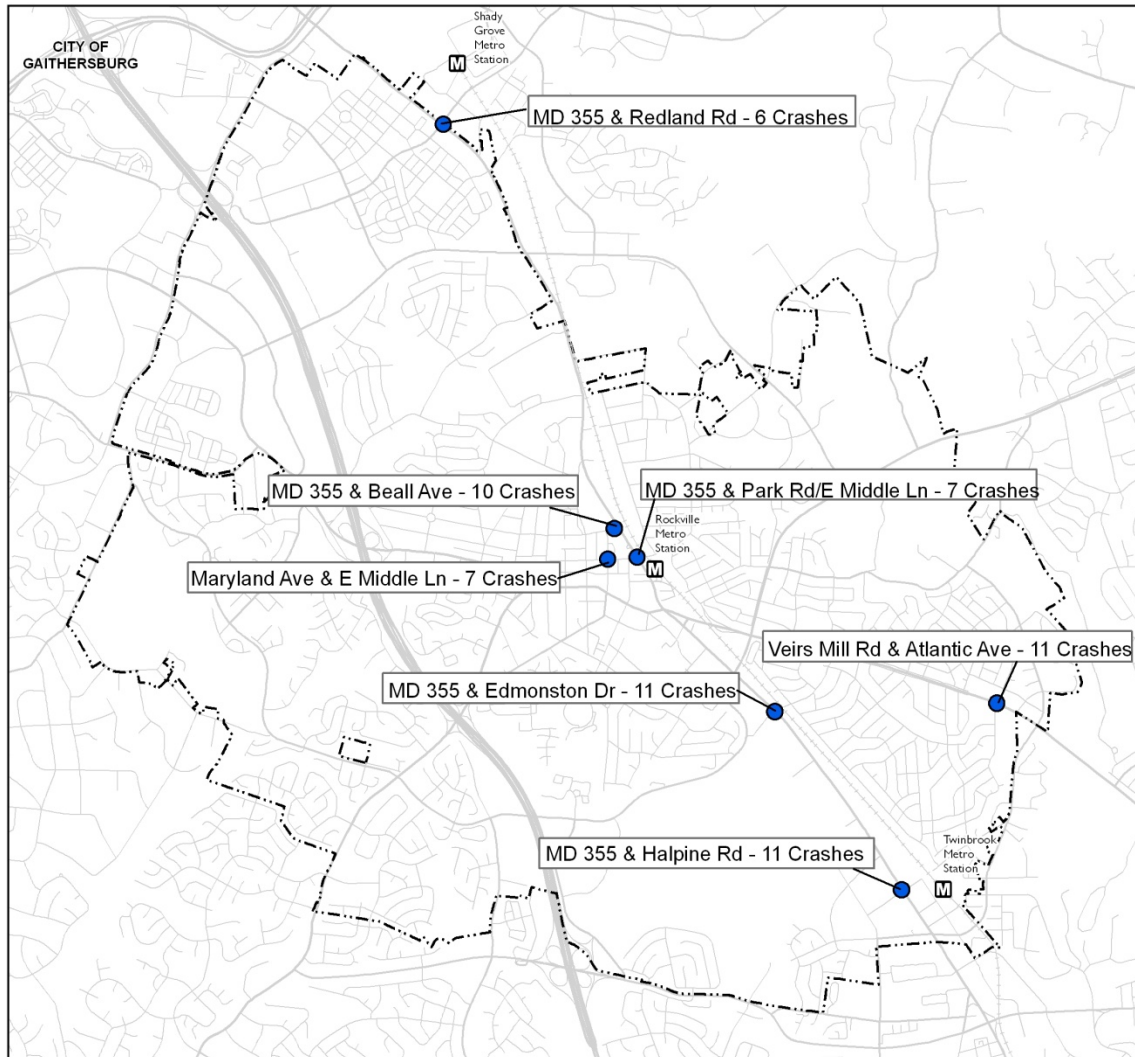
Completing all missing sidewalk segments in the City will not be possible. Several segments are physically constrained by existing right-of-way or are generally too small to consider (i.e., small cul-de-sacs that were developed without connecting sidewalks). Many areas already have sidewalks on one side of low-volume streets that decrease the urgency of completing the sidewalk on the opposite side. Likewise, several areas have engineering constraints such as grade, existing storm drains, and the lack of curb and gutter that would turn what appears to be a simple sidewalk installation into a larger and more expensive road reconstruction project.

### **Competing Values**

Balancing the needs of all modes can also be challenging. A common example of where the needs of pedestrians and vehicles conflict are at signalized intersections. In some locations, pedestrians may need more crossing time than what is given in a signal’s interval. In these cases City staff evaluates the time needed for the pedestrians to cross a leg of the intersection as well as the effect on vehicular traffic flow through the intersection should the signal interval be lengthened.



## Intersections with 6 or More Crashes Involving Pedestrians (2008 - 2013)



0 0.5 1 2 Miles



February 2015

**Figure 11: Intersections with Two or More Pedestrian Crashes 2008-2013**

### **Coordination with other Jurisdictions**

Rockville coordinates signal timing modifications with the County and State. Rockville controls the signal timing on its own traffic lights (46), which are primarily located along City-owned and – operated streets. Typically, the State and County control the signal timing on traffic lights on State- and County-owned streets (64). When the City notices shortcomings in crossing times or the frequency of the crossing phases along State or County roads through Rockville, or receives requests from residents, City staff investigates the lights. If City staff determines that the requested modification is appropriate, they will pass the request on to the State or County who then review the case and determine a course of action. As Rockville residents are also residents of the County and State, they are able to make requests directly to County and State agencies and departments.

## **III. CITY OF ROCKVILLE TRANSPORTATION INITIATIVES AND POLICIES**

This section of the Transportation Scan identifies and summarizes the initiatives and policies that City staff uses to maintain, improve, and expand the City’s complex transportation network. The section begins with the initiatives that address the needs of two or more travel modes simultaneously (multimodal initiatives), followed by subsections for each specific travel mode: automobile, transit, bicycle, and pedestrian.

### **A. MULTIMODAL INITIATIVES AND POLICIES**

Rockville embraces innovative strategies to expand travel options within the City. This is clear from the City’s multi-modal approach when addressing transportation needs. The City upholds initiatives and policies that address the needs of multiple travel modes simultaneously. These are described below.

#### *MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES*

Uniformity of traffic control devices for all modes is imperative to ensure a safe, intuitive, and consistent transportation network. The Federal Highway Administration (FHWA), under the US Department of Transportation, sets national standards for traffic control devices that direct all road users such as signs, pavement markings, and signals with the Manual on Uniform Traffic Control Devices (MUTCD). For example, the MUTCD establishes the correct, size, color and language for signs. There are also standards and guidance on where, when, and how to post signs and install pavement markings. Compliance with the MUTCD is required for all federal-aid funds, and failure to do so could result in severe legal liability. The MUTCD is updated regularly and is available for free to the general public. The most current edition of the MUTCD was published in December of 2009.

The Maryland MUTCD (MdMUTCD) is a combined document of the national set of traffic control device standards put forth by FHWA and the Maryland Supplement to the MUTCD. States are permitted to adopt a State MUTCD so long as it is in substantial conformance with the current

MUTCD<sup>11</sup>. Generally State DOTs do this as a way of being more prescriptive than the national standard. For example, a State can turn a “should” from the National MUTCD guidance into a “shall” for the State MUTCD. Maryland published the MdMUTCD in 2011.

All jurisdictions in the state of Maryland follow the MUTCD. Rockville’s Mayor and Council have adopted the updated MdMUCTD since at least 1989<sup>12</sup>. Therefore, the City of Rockville complies with the mandatory aspects of the MdMUCTD. It should be noted that City has the option of adopting advisory aspects as provided by the Maryland Department of Transportation.

### *TRANSPORTATION DEMAND MANAGEMENT*

Transportation Demand Management (TDM) is a general term for strategies that increase transportation system efficiency. The focus of TDM strategies is to provide enhanced travel choices –choices in travel mode, travel route, and trip departure time – and to provide incentives and information for people to make informed travel choices. A TDM Plan was adopted by the Mayor and Council in March 2011 to accomplish the following:

- Establish a long-term vision for TDM in the City of Rockville
- Increase coordination amongst members of Rockville City staff between City departments, divisions, and work groups
- Focus limited financial resources to achieve a coordinated long-term TDM vision for Rockville

The TDM Plan recommendations, based on a moderate TDM program, are designed to maximize the efficiency of the existing programs and encourage new alternative transportation modes. In order to build a foundation for success, it was recommended five activities be the first actions of the City of Rockville TDM Plan. All have been successfully implemented and are listed below:

1. Implement first priority multimodal improvements identified in the plan
2. Establish Employer Trip Reduction programs
3. Implement the Trip Reduction Tool that reduces the number of new generated trips
4. Formalize the Transportation Demand Management Fee
5. Adopt the revised Comprehensive Transportation Review Methodology

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<sup>11</sup>According to the Code of Federal Regulations, 23 CFR 655.603(b) states that "substantial conformance means that the State MUTCD or supplement shall conform as a minimum to the standard statements included in the National MUTCD" and that "the guidance statements contained in the National MUTCD shall also be in the State Manual or supplement unless the reason for not including it is satisfactorily explained based on engineering judgment, specific conflicting State law, or a documented engineering study.

<sup>12</sup> Documentation of the first year the Mayor and Council adopted the MUTCD was not found. The earliest record found indicates the Mayor and Council adopted an update of the MdMUTCD in 1989.

### *COMPREHENSIVE TRANSPORTATION REVIEW (CTR)*

In 2004, Rockville's Mayor and Council adopted the CTR, and the policy was updated in 2011. This policy applies to all development or redevelopment applications filed on or after September 29, 2004. The development of the CTR process came from a need to effectively uphold the APFO. The outcome of the CTR is twofold; all applicants for development in the City must submit a Transportation Report that assess multi-modal impacts to and adjacent to the site, and applicants are required to implement mitigation measures to alleviate impacts to the transportation system as a result of the new development as necessary. If applicants fail to comply with any aspect of the CTR, the application is denied. The CTR carries the same weight as any review process conducted for stormwater management, forestry, and zoning code compliance.

Because the CTR evaluates the overall transportation system from a comprehensive, multimodal perspective, it is linked to the goals in City plans and policies. Transportation goals set forth in the City Master Plan form the basis for the methodology, standards, and impact thresholds outlined in the requirements. Development applicants must comply with the requirements of the CTR.

Key aspects of the transportation review process include the Scoping Intake Form, Transportation Report, analysis of nearby intersections, and mitigation requirements. The Scoping Intake Form helps City staff determine if the proposed development will likely have a significant impact on the transportation system, by estimating the number of new trips to and from the site due to the proposed development. If the trip generation estimate for a proposed development forecasts a significant increase in peak hour trips, traffic mitigations may be necessary to maintain traffic flow and efficiency. The Transportation Report requires the applicant to assess existing multi-modal conditions on and adjacent to the site and compare how the new site will impact all users. After reviewing the Transportation Report, and any other required analysis, City staff will determine if mitigation actions are necessary. Mitigation requirements can include the Transportation Improvement Fee<sup>13</sup>, off-site improvements, intersection mitigation and/or a Trip Reduction Plan.

It is rare, but possible, for a proposed project to be denied based on trip generation estimates. If staff determines that the project will generate enough trips to exceed an intersection's capacity, and if the intersection cannot be improved in a way that will accommodate that capacity, the project must be denied. Within the last 10 years, only one project faced this dilemma. Generally, projects are able to find ways to reduce the number of trips generated by the site, or mitigation can be achieved.<sup>14</sup>

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<sup>13</sup> Revenues generated by the transportation improvement fee are used to pay for multimodal improvements within the vicinity of the site. Examples include sidewalks, refuge islands, curb ramps, bus shelters, etc.

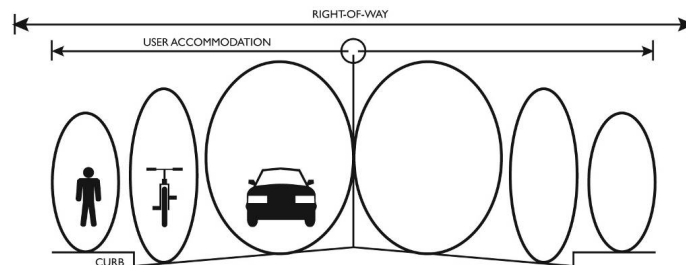
<sup>14</sup> Unfortunately, the project applicant was Montgomery County, and the project was constructed despite the fact it did not meet Rockville's standards for development review.

### *COMPLETE STREETS POLICY*

In 2009, the City adopted a Complete Streets Policy to ensure all streets include facilities to make them accessible, navigable, and comfortable for all users including pedestrians, bicyclists, transit users and motorists, to the extent appropriate for the land use or the context of the street. A key distinction of this policy is the departure from a sole focus of minimizing traffic delay for private motor vehicle transportation. Under the framework of the Complete Streets Policy, it is recognized that prioritizing efficiency for motor vehicles may be undesirable depending on the surrounding land use and needs of other roadway users.

Complete Streets goals and strategies have significant overlap with the ADA accessibility guidelines. Improvements such as handicapped accessible ramps at intersections with detectable warning surfaces for the visually impaired are commonly associated with both Complete Streets and ADA. Other characteristics of Complete Streets are features that create a multimodal-friendly environment, such as narrow traffic lanes, median refuges, road re-striping to include bicycle lanes, parking reconfiguration, curb extensions (“bulb-outs”), accessible pedestrian signals and countdown pedestrian signals. Like many suburbs, most areas in Rockville were designed for automobile transportation and lack multimodal facilities such as sidewalks, bus shelters, and bicycle lanes.

Street design should relate to the surrounding land uses and needs of transportation users. For example, in areas with moderate to high density land uses, and relatively high traffic volumes, it may be appropriate to provide separate and designated facilities for each transportation mode. See Figure 12 for a conceptual drawing showing how each user has a separate space on the roadway.



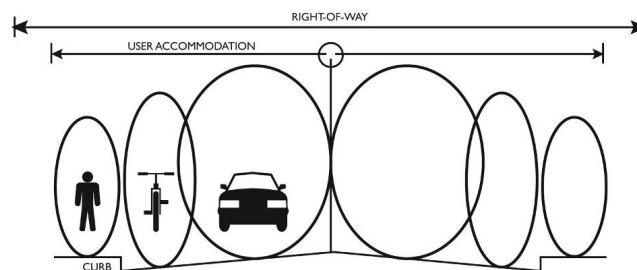
**Figure 12: Complete Streets Concept, Designated Facilities for All Modes**

An example within the City of Rockville is South Stonestreet Avenue, which is a primary industrial road. The Complete Street design concept could be implemented by restriping the road to add bicycle lanes and buffered sidewalks on both sides of the street to provide designated facilities for pedestrians, bicyclists, and drivers. Figure 13 shows how South Stonestreet Avenue would look with added bike lanes and sidewalks.

The South Stonestreet Avenue example is easiest to apply when there is enough width to accommodate all users. In contrast, areas with lower land use densities and lower traffic volumes, it may not be necessary to separate all users. Figure 14 shows a concept of how some transportation modes could safely share the same space, some of the time.



**Figure 13: South Stonestreet Avenue as it is today (top) and as it could be with added bike lanes and sidewalks (bottom)**



**Figure 14: Complete Streets Concept, Intermittently Shared Facility for Bicycles and Automobiles**



Another example, Ardennes Avenue, a Primary Residential Class II road, will likely experience lower traffic volumes traveling at relatively low speeds. The existing roadway width is constrained and widening the road to provide separate facilities for all users would be difficult. With lower traffic volumes and speeds, it is not necessary to fully separate bicyclists and motorists. The lanes are wide enough to accommodate drivers and on-street parking. Where cars are not parked, bicyclists have a wide outside lane. Where cars are parked, bicyclists can share the road with motorists. In this scenario, the best fit solution is to provide a centerline to help visually narrow the roadway and install signs that indicate that the travel lane is to be shared by drivers and bicyclists. Pedestrians are separated with buffered sidewalks on both sides. Figure 15 is a rendering showing how this approach could be implemented on Ardennes Avenue.

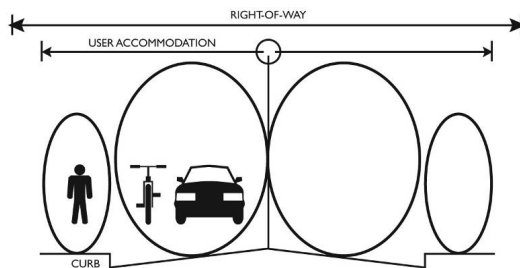


**Figure 15: Ardennes Avenue as it is today (top) and as it could be with a striped center lane and shared roadway signs (bottom).**

A third example, Anderson Avenue, shows how a narrow, low density residential street could accommodate all users with minimal changes to the roadway. Bicyclists and motorists share the roadway and pedestrians are provided a sidewalk adjacent to the curb. While it would be ideal to provide separate facilities for all users on both sides of the street, the narrow roadway widths and shallow setbacks for the homes make it infeasible to install designated transportation facilities. The



relatively low traffic speeds and traffic volumes make it possible for automobiles and bicycles to share the lane. Figure 16 illustrates this concept.



**Figure 16: Complete Streets Concept, Fully Shared Facility for Bicycles and Automobiles**

Past



Anderson Avenue, between Nelson Street and Forest Avenue, is a good example of this third concept. Anderson Avenue provides a good connection for bicyclists and pedestrians, but is not a primary connective roadway for cars. See how this concept is applied Figure 17.

Current



An appropriate Complete Street treatment for Anderson Avenue would be to install a sidewalk one side of the street. Shared lane markings or “sharrows” (not shown) could also be applied to show bicyclists where to safely ride in the street (away from the door zone of parked cars) and to remind motorists to be aware of bicyclists on the road. This is still a “Complete Street” design, even though some modes are

**Figure 17: Anderson Avenue as it was in 2009 (top) and as it today with a sidewalk on the north side of the street (bottom).**

sharing the same space. It is “complete” because all modes have been considered in the design of the roadway, and the needs have been appropriately met.

Complete Streets concepts complement many of Rockville’s other transportation plans and policies. For instance, the Bikeway Master Plan provides guidance for bicycle lane placement, the Sidewalk Prioritization Policy provides priority for sidewalk installation, and the Pedestrian Policy sets forth

a pedestrian walking speed to calculate crossing times. Furthermore, the Comprehensive Transportation Review requires developers to assess all multimodal features of a development site and make improvements accordingly, and the Guidelines for Neighborhood Traffic Management provides guidance for traffic calming projects. The intent of Rockville's Complete Streets initiative is to bring all of these policies together and address the mutual concerns of the policies by both applying their procedures in prioritizing Complete Street projects and by using its guidelines during the design and construction of the projects.

### *GUIDELINES FOR NEIGHBORHOOD TRAFFIC MANAGEMENT*

In July 2011, the City published its Guidelines for Neighborhood Traffic Management. The guidelines explain how Rockville is committed to the goal of maintaining livable residential neighborhoods. A major threat to that goal is excessive vehicular speed and traffic volume on residential streets.

Excessive traffic volume on residential streets, especially where neither the origin nor destination of that traffic lies within the neighborhood, is undesirable. It adds to traffic congestion and can have negative effects on the quality of life within the neighborhood, such as increased noise, vibration, air pollution, visual intrusion, and accelerated deterioration of the streets themselves. Although the strategies address motor vehicle speeds, the intent of the Guidelines is to improve safety for all travel modes. Managing motor vehicle speed and volume in residential settings improves travel conditions for bicyclists, pedestrians, transit users, and even drivers.

There are several causes of increased volumes of non-neighborhood traffic using residential neighborhood streets, including congestion and delay on nearby arterial streets, commercial development in areas adjacent to neighborhoods, and residential street patterns that become convenient routes for through traffic.

To counter the effects of excessive traffic speed and volume, the City developed strategies to divert or otherwise alter traffic flow through neighborhoods and calm traffic through reduced speed. Neighborhood traffic management strategies fall into two categories; passive controls and physical controls. Specific strategies include:

1. Passive Controls (signs)
  - Turn Prohibitions
  - Entry Prohibitions
  - One-way
  - Increased Moving Violation Fines
  - Variable Speed
  - Warning

## 2. Physical Controls

- Diagonal Diverters and Semi-Diverters
- Intersection Channelization Facilities
- Traffic Circles
- Speed Humps and Raised Crosswalks
- Chicanes
- Road Narrowing, Chokers, Intersection Narrowing

Remedial measures to reduce traffic volume and speed have proven to be generally successful, both in Rockville and in many other communities. Plans implemented to manage neighborhood traffic create a safer, more pleasant residential environment. An added benefit of traffic diversion techniques is that they reduce incidents of speeding at a proportion equal to or greater than the percentage reduction in traffic volumes.

### *STREET LIGHTING PROGRAM*

Street lighting affects all transportation modes. In dark and poor visibility conditions, it is difficult for transportation users to be able to see and to be seen to travel safely. Rockville continues to maintain, and where appropriate, upgrade and improve streetlight infrastructure.

There are two types of streetlights in the City: the overhead-fed streetlights (OH lights) and the underground-fed streetlights (UG lights). Pepco owns and maintains the OH lights, and the City owns and maintains the UG lights. Repair of all power outages, however, is performed by Pepco regardless of type. The total number of streetlights in the City as of October 2014 is 6,573 lights, of which 3,502 lights (53 percent) are OH lights. It should be noted that the City funds all new lights, including those on Pepco's wooden poles.

The OH lights have two kinds of lamps: Mercury Vapor (MV) and the brighter High Pressure Sodium (HPS). All UG lights are HPS. The MV lights usually fade gradually, and therefore, most lights should be replaced every five years. There are currently 1,416 MV lights in Rockville, and they are all on Pepco poles. Pepco has a plan to convert all MV lights to HPS. All city-owned lights are HPS, except for approximately 180 Light-Emitting Diode (LED) lights that were installed within the last two years by way of a grant from the Department of Energy<sup>15</sup>. These LEDs are installed at City's metered lights where the City pays only for the power consumed by these lights. It should be noted that City and County staff have been negotiating LED rates with Pepco for both UG and OH lights.

During the period between FY 2006 and FY 2008, City staff converted approximately 100 MV OH lights to HPS lights, which provide approximately 50 percent increase in illumination. Among the locations that received those conversions are Grandin Avenue (between Crabb Avenue and Nimitz Avenues), Ardennes Avenue (between Veirs Mill Road and Halpine Road), North Horners Lane

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<sup>15</sup> The DOE's Energy Efficiency and Conservation Block Grant (EECBG) grant was awarded to the City in 2009. After the State and County started installing LED streetlights by way of the grant, the City took up the same initiative.

(between Dover Road and McArthur Drive), Meadow Hall Drive and Great Falls Road. Most of this work was performed in the east side of Rockville near Metro stations. In 2008, Pepco announced a long-term plan to convert all their MV OH lights to HPS lights. Therefore, City staff decided not to fund more conversions (from MV to HPS) unless it is necessary since Pepco would fund and perform this work in the near future. It should be noted that the cost of the conversion of one light is in the range of \$1,000. As of today, Pepco has not completed the conversion project in Rockville.

It should also be noted that almost all streetlights in the east side of Rockville are OH lights, owned and maintained by Pepco. The process to upgrade these lights, by either adding new lights or to upgrade existing lights includes several steps:

1. City requests a proposal from Pepco,
2. Pepco prepares a proposal,
3. City accepts the proposal, and
4. Pepco performs the work. This process takes between 6 and 12 months because Pepco completes the design for the upgrade before submitting a proposal. This step alone takes between three and nine months, depending on the case.

In the last five years, City staff has been working on two parallel plans to improve streetlights in the east side of Rockville. The first plan was to trim trees to clear streetlights and the second plan was to add new lights on Pepco poles, where streetlights are not available, and where needed. Trees were pruned by the City crew and contractors and included the following streets east of MD 355: Broadwood Drive, Charles Street, Crawford Drive, Edmonston Drive, Farragut Avenue, Gilbert Road, Grandin Avenue, Gruenther Avenue, Halsey Road, Holland Road, Lewis Avenue, Linthicum Street, Lofstrand Lane, MacDowell Street, McAuliffe Drive, Rockland Avenue, Taft Street, Thornden Road, Twinbrook Parkway, and Woodburn Road. New lights were added on Pepco poles near Twinbrook and Rockville Metro stations.

The City maintains an online interactive map of all of the City's streetlights. The online map is used as a tool to help the public report streetlights that are damaged or not functioning properly. A screen capture is provided in Figure 18 on the next page. It is important to note that the City maintains the majority of the streetlights within the City, but several neighborhoods, such as Twinbrook and parts of the West End, are maintained by Pepco. Furthermore, nearly all of the streetlights along State roadways are maintained by Pepco, and not the City of Rockville.

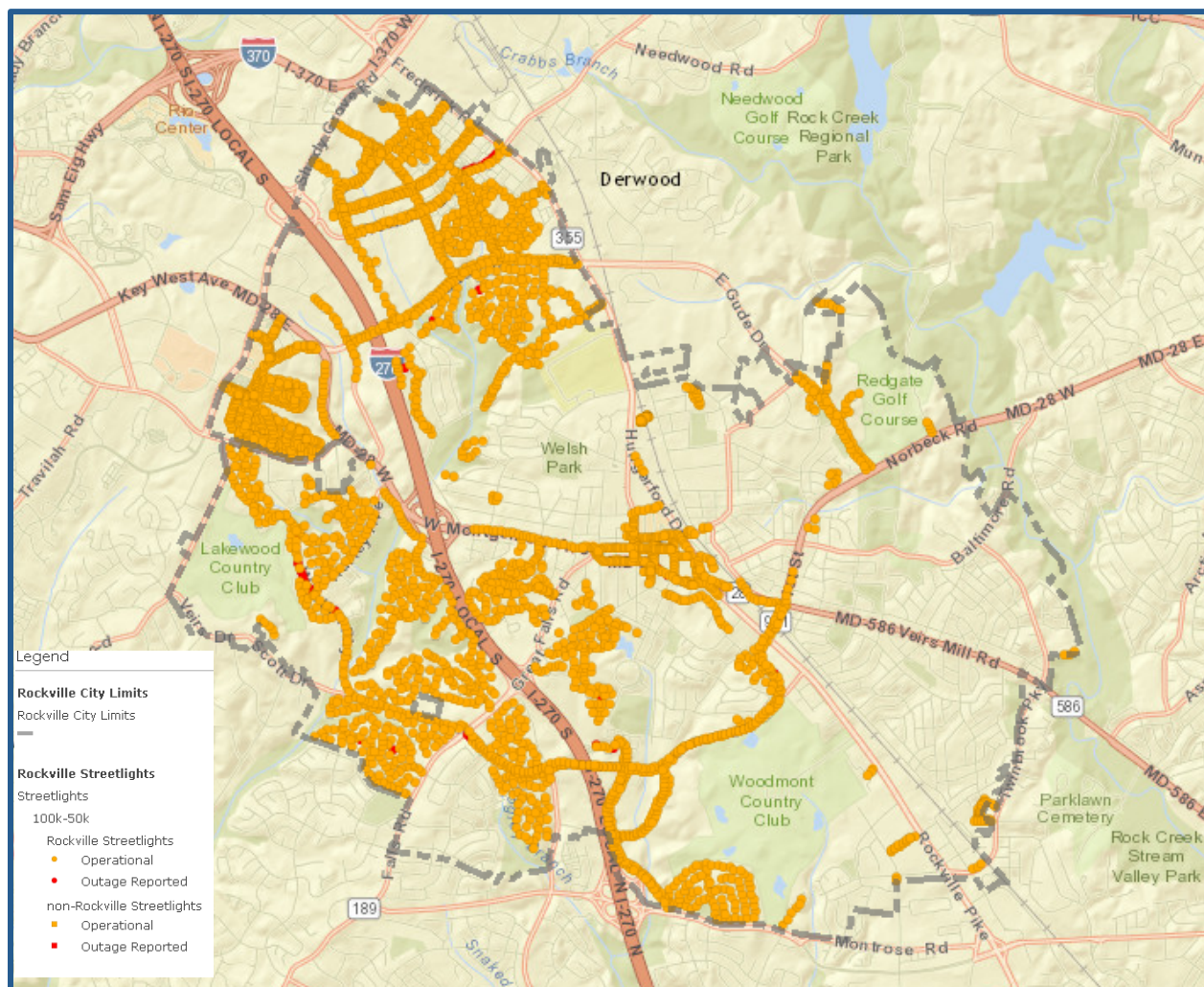
## **B. AUTOMOBILE INITIATIVE**

The City addresses the needs of drivers in several initiatives, but the majority of these needs were addressed in the previous section, Multimodal Initiatives. Chapter 21 of the Road Code focuses on streets, public improvements, and thus, impacts the automobile travel.

### *ROAD CODE*

Chapter 21 in the Rockville City Code outlines the requirements for Streets and Public Improvements. Article II, Road Construction, Excavations, and Maintenance, describes the process for the creation of new roads and reconstruction of existing roads in the City. The "Road Code"

ensures that the City builds roads to certain specifications, including minimum right-of-way width, number and width of travel lanes, and the width of and amenities in the pedestrian space, based on the type of road. In 2014, City staff initiated an effort to update the Road Code to make sure the designs the City mandates are up to current Complete Streets standards. In October 2014, the Mayor and Council passed an ordinance to create two Business District road sub-classifications to delineate between the two types of Business District roads that already existed without formal recognition. The new classification established new requirements for sidewalk widths, buffer, bicycle facilities, and parking as needed. City staff will move forward with additional updates for Chapter 21 of Rockville's City Code in the near future to bring City requirements up to existing standards.



**Figure18: Streetlights Maintained by the City**

## C. TRANSIT INITIATIVES AND POLICIES

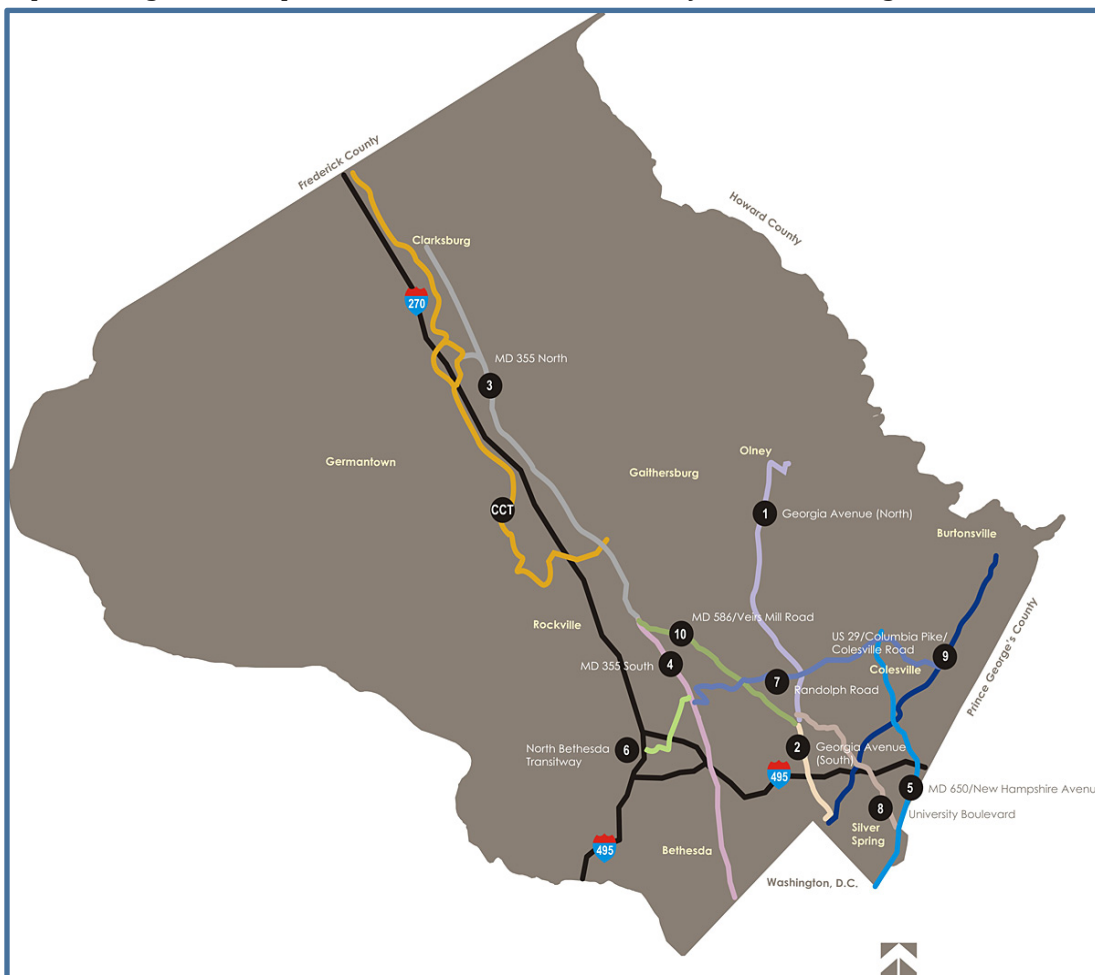
Rockville is currently coordinating efforts with both the County and State on two large public transit projects: the Corridor Cities Transitway and the introduction of Bus Rapid Transit to the area.



**MARYLAND TRANSIT ADMINISTRATION CORRIDOR CITIES TRANSITWAY (CCT)** – The CCT is a bus rapid transit service in mid-Montgomery County that is proposed by the Maryland Transit Administration (MTA). While the project is managed by MTA, the project is to become part of the County’s proposed countywide bus rapid transit network. The CCT service is planned to run approximately 15 miles, between the Shady Grove Metro Station and the COMSAT facility near Clarksburg. Phase I is currently being designed, from Shady Grove Metro to Metropolitan Grove. Two stops are planned within Rockville – both within the King Farm neighborhood along King Farm Boulevard. Recent MTA schedules anticipate construction to begin in spring 2018, depending on funding for construction. The planned route for the CCT is shown in Figure 19.

**MONTGOMERY COUNTY BUS RAPID TRANSIT (BRT)** – Montgomery County is evaluating alignment and street design alternatives for a bus rapid transit network to improve accessibility and mobility throughout the county. The County is currently studying BRT along ten routes, including three in Rockville: MD 586 (BRT Route 10), MD 355 North (BRT Route 3), and MD 355 South (BRT Route 4). These potential routes are still in early planning phases.

A map showing all of the planned BRT routes in the County is shown in Figure 19.



**Figure 19: Planned Bus Rapid Transit Routes in Montgomery County**

## D. BICYCLE INITIATIVES AND POLICIES

Previous efforts to address the needs of cyclists focused on improving conditions for recreational riding. Recognizing the increased interest in bicycling for short, local errands and commuting, the City is now planning to improve conditions for transportation.

### *BIKEWAY MASTER PLAN*

The City is currently in the process of updating the Bikeway Master Plan, which was last updated in 2004. The Bikeway Master Plan is intended to be used as a guide for City staff, elected officials, and residents to improve bicycle infrastructure and programs over the next ten years. When fully implemented with an additional 42.6 miles of bikeway facilities and shared lane designations, the Plan should help to provide a safe, practical, and efficient bikeway network that is connected with commercial, cultural, recreational, residential, and employment destinations throughout the City. The updated version adds additional emphasis to on-street bicycle facilities, which is the purview of DPW and complements the off-street path system that already exists. The Department of Public Works is spearheading the process of updating the Bikeway Master Plan, which is currently under review by the Planning Commission.

### *BIKESHARE*

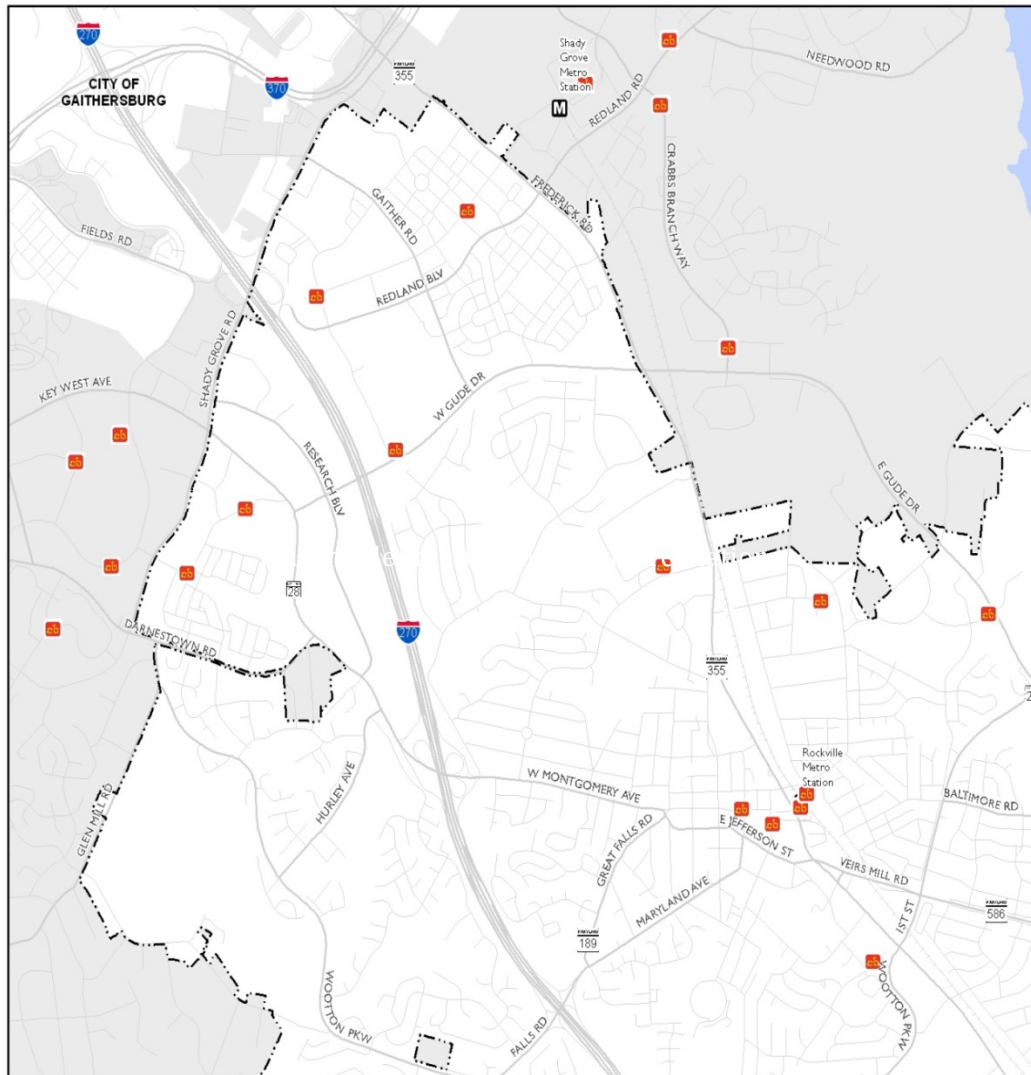
An expansion of the bike-sharing service Capital Bikeshare was introduced into Rockville in September 2013, under a project coordinated by Montgomery County. A total of 21 stations were initially installed in the Rockville/Shady Grove area with 13 stations directly in Rockville. In the first year of the program, bicyclists took 4,829 trips on bikeshare bikes, and 152 people in Rockville were signed up as members. As of August 2014, the highest use stations include the two stations along King Farm Boulevard and the station at the Shady Grove Metro station. In the same month, the average mileage per trip was 2.43 miles from any station in Rockville.

A map of Rockville's Bikeshare stations is shown in Figure 20.

### *BICYCLE-SENSITIVE TRAFFIC SIGNALS*

Rockville has a variety of traffic signal types, including in-road sensors, pixelated cameras, and infrared cameras. In 2014, City staff adjusted several of the pixelated cameras to increase the sensitivity, allowing them to detect when bicycles are present and trigger the signal to switch even if an automobile is not present. These are the first cameras in the City to utilize this technology, and additional cameras will be adjusted to detect bicycles. The City is exploring the use of pixelated or infrared cameras at City-operated traffic signals, and bicycle detection will be included with future camera installation when practicable.

## Bikeshare Stations



### Legend

 Bikeshare Stations

0 0.375 0.75 1.5  
Miles



February 2015

**Figure 20: Capital Bikeshare Stations in Rockville**



## E. PEDESTRIAN INITIATIVES AND POLICIES

Before the City adopted a Complete Streets Policy, Rockville was becoming aware of the unique needs of pedestrians. In the years leading up to the adoption of the Complete Streets Policy, Rockville established two initiatives that prioritize pedestrian travel needs.

### *PEDESTRIAN POLICIES*

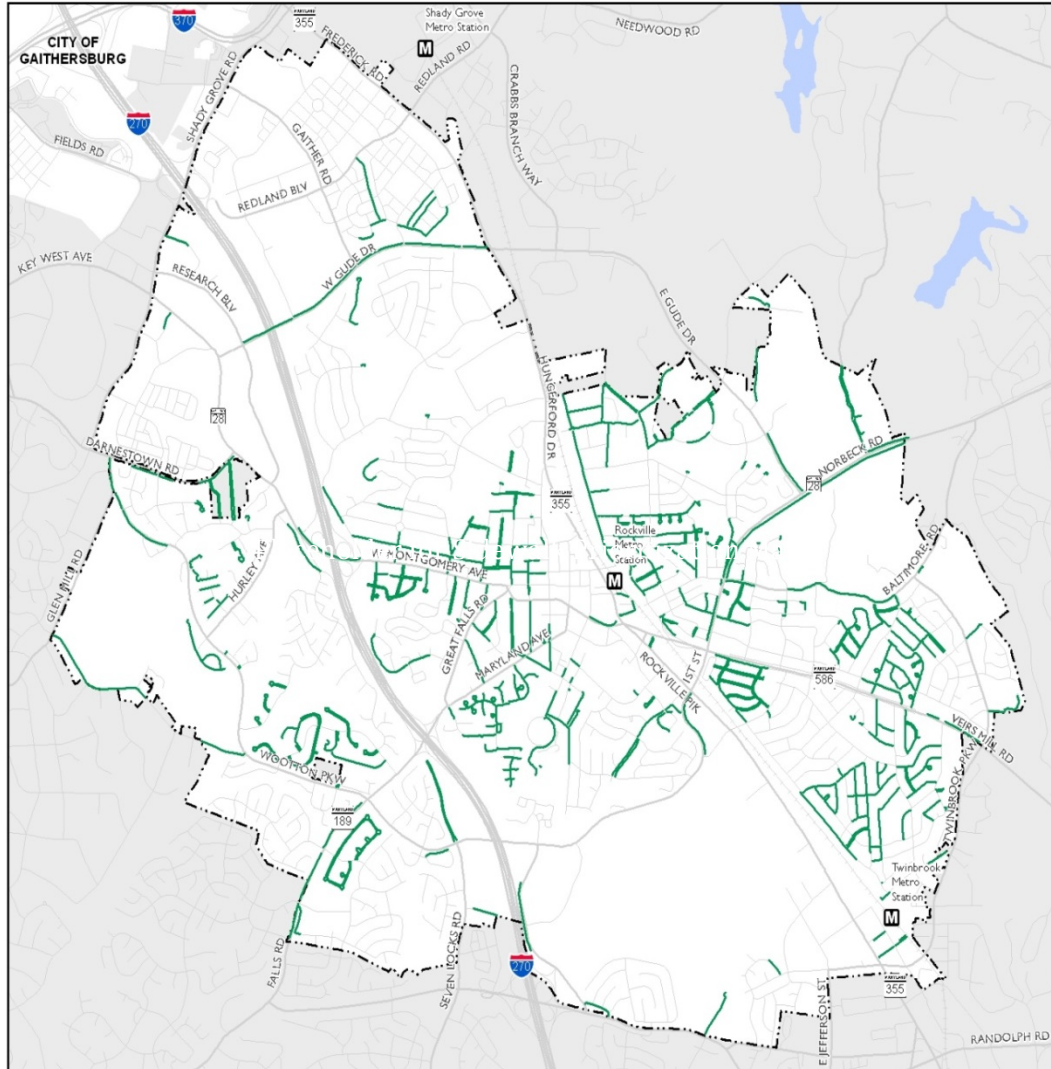
In July of 2008, the Mayor and Council directed City staff to address the needs of pedestrians more thoroughly in Rockville by developing a unified pedestrian policy. The Pedestrian Policies are intended to be a “living document”, composed of a series of individual policy statements, which is updated as policies are formulated, amended, or deleted. The Policies are divided into nine topical areas: sidewalks, pedestrian paths, accessibility, development design, crosswalks, traffic signals and signs, enforcement and security, education, and physical fitness and health.

Within these policies lies information that is codified in the Rockville City Code regarding requirements such as sidewalk construction and width, pedestrian enhancements such as pedestrian refuge islands and leading pedestrian intervals, crosswalk locations, and sidewalk repairs and maintenance.

### *SIDEWALK PRIORITIZATION POLICY*

The sidewalk prioritization policy was established in 2007 to identify and prioritize sidewalk gaps. As a result, all sidewalk gaps in the City have been given a score to determine highest and lowest priorities. These gaps are given two numerical scores, and then a series of qualitative considerations are addressed. The first numerical score, the “Utility Score,” gauges the usefulness of the sidewalk, and the second numerical score, the “Traffic Conditions Score,” is composed of information about street classification, traffic volume, speed, on-street parking, and pedestrian crashes. There are approximately 56 miles of sidewalk gaps in the City. Capital Improvement Program, speed camera, grants, and developer funds are used to construct these missing sidewalks based on the priority score, public requests, and the alignment with other projects in the city. There is no established timeline for the completion of these missing sidewalk segments, though City staff constructs on average 3,000 linear feet of missing sidewalk per year. The Department of Public Works proposes sidewalks to construct based on the availability of funds and status of other projects around the City. The Mayor and Council approve the sidewalk construction projects through the CIP. A map of the identified gaps in the sidewalk network is shown in Figure 21: Missing Sidewalks in Rockville.

## Missing Sidewalks



### Legend

— Missing Sidewalks

0 0.5 1 2 Miles



February 2015

**Figure 21: Missing Sidewalks in Rockville**

### *PEDESTRIAN SAFETY AND ACCESSIBILITY EVALUATION*

City staff periodically conducts studies to evaluate pedestrian safety and accessibility. In 2009, City staff created an inventory of traffic control devices such as signs, crosswalks, countdown signal heads, and other amenities such as ADA curb ramps, streetlights and any other traffic control devices. The inventory included 110 signalized intersections and 52 uncontrolled marked crosswalks at school zones, metro stations, parks, and retail centers<sup>16</sup>. The goals of the inventory were to identify safety and accessibility deficiencies, rate deficient locations, and prioritize improvements.

All elements related to pedestrian facilities such as ramps, sidewalks, crosswalks, pedestrian signs, sight distance, lighting, pedestrian signals, signal push buttons, and pedestrian signal timing were reviewed and assessed. After analyzing the results, recommendations were provided.

The analysis concluded the following:

1. The City's pedestrian crossings are generally in very good condition.
2. Most recommended improvements result from changes in pedestrian facility design guidelines such as ADA compliant curb ramps and pedestrian clearance intervals.
3. City-maintained facilities have less serious deficiencies than County-maintained facilities.

The City followed up with both the County and the State and shared the study's results with them so they can follow up with their own improvements at their intersections.

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<sup>16</sup> The inventory included intersections with roadways owned and maintained by the City as well as the State.